PB-230 581

POLLUTION OF LAKE ERIE AND ITS TRIBUTARIES - INDIANA-MICHIGAN-NEW YORK-OHIO-PENNSYLVANIA. PROCEEDINGS OF CONFERENCE, FIFTH SESSION, HELD AT DETROIT, MICHIGAN ON JUNE 3-4, 1970. VOLUME 2

Federal Water Quality Administration
Washington, D. C.

4 June 1970

DISTRIBUTED BY:

NTIS
National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

PB 230 581 ;

PROCEEDINGS

LAKE ERIE
DETROIT
BUFFALO
ERIE
CLEVELAND
FORT WAYNE

Fifth Session
Detroit, Michigan
June 3, 4, 1970
Vol. 2

CONFERENCE

In the Matter of Pollution of Lake Erie and its Tributaries – Indiana-Michigan-New York-Ohio-

U. S. DEPARTMENT OF THE INTERIOR • FEDERAL WATER QUALITY ADMINISTRATION

438

FIFTH SESSION OF THE CONFERENCE IN THE MATTER OF POLLUTION OF LAKE ERIE AND ITS TRIBUTARIES (INDIANA-MICHIGAN-NEW YORK-OHIO-PENNSYLVANIA)

Cobo Hall
Detroit, Michigan
June 4, 1970

CONTENTS

STATEMENT OF:	Page
Frank J. Kallin	423
Al R. Balden	439
Gerald J. Remus	444
Hillel S. Liebert	505
George H. Eagle	515
Walter A. Lyon	570
Perry Miller	590
Russell C. Mt. Pleasant	602
Lowell A. Van Den Berg	646
Albert M. Shannon	725
R. W. Purdy	728

JUNE 4, 1970
9:35 a.m.

PROCEEDINGS

MR. STEIN: We will reconvene with Mr. Purdy.

MR. PURDY: Yes, Mr. Stein.

I would like to call now upon Mr. Frank Kallin, Ford Motor Company, for a statement.

STATEMENT OF FRANK J. KALLIN

FACILITY ENVIRONMENTAL CONTROL MANAGER

FORD MOTOR COMPANY

DETROIT, MICHIGAN

MR. KALLIN: Mr. Chairman, conferees and ladies and gentlemen, my name is Frank J. Kallin and I am manager of Facility Environmental Control for Ford Motor Company.

I appreciate this opportunity to report on the continued progress Ford Motor Company has made in wastewater control at its Rouge and Monroe plants since the June 1965 session. Improvements have been brought about variously by new waste treatment facilities, expansion and modernization of existing facilities, and by process changes which have eliminated or minimized waste producing operations.

At the Rouge manufacturing area, our primary waste water tasks have been the reduction of suspended solids, phenol, oil, and the dissolved iron from steel pickling liquor. At Monroe, our tasks were concerned with reducing cyanide and holding bacteria, oil, and phosphates to specified limits. I will discuss the steps we have taken and are taking to bring each of these within the limitations stipulated by the Michigan Water Resources Commission.

First, suspended solids. At the time of the 1965 conference, 4 of the 5 major outlets in the Rouge complex were already under the objective of 50 milligrams of suspended solids per liter. Excess solids in the one exception resulted from the grinding and polishing of glass. Since then, this solids loss has been eliminated at the source by a new float glass-making process which does not require the grinding and polishing operations.

However, a minor "trade-off" with improved air pollution controls at the Rouge powerhouse and the Dearborn Specialty Foundry has given us an interim problem with suspended solids.

New dust collector equipment installed at the powerhouse removes more suspended particulates of smaller micron size from the boiler exhaust gases and a part of these solids are lost to the sewer system through a water induced vacuum system. The temporary condition will be corrected by the installation of a so-called "Baghouse" filter system scheduled for completion by next January 15.

At the specialty foundry, the solids are suspended particulates trapped from exhaust air by new wet collectors on the cupolas. Along with the wet collectors, we installed an elaborate diatomaceous earth filtration system for removing the particulates from the water -- in effect, a full-scale research project since this type of filter had not previously been used for this application. We hoped and expected it to yield filtered water containing less than 5 milligrams of suspended solids per liter, but unfortunately the system failed to work despite extensive changes tried out by both the supplier and Ford. We are now designing a system using the more proven principle of clarification which will reduce the suspended solids content from our cupola wet scrubbers to less than 25 milligrams per liter. Preliminary planning will be completed this month and the system will be in operation before the end of 1971. Although not as significant, we have been able to reduce suspended solids losses by initiating a program of converting to dry in-plant dust collectors.

Naturally, we are disappointed at the lack of success with the diatomaceous earth approach which appeared to hold so much promise. However, we think the data and experience we acquired will be of value in establishing and determining equipment limitations for future applications.

Now, with respect to phenol, in our coke-making operations at the Rouge, we generate approximately 1,200 to 1,400 pounds of phenol a day. By pumping the final cooler water into a deep disposal well, we were able to reduce the quantity of phenol discharged into the Rouge River to less than the limit of 600 pounds a day required in the 1952 order from the Michigan Water Resources Commission.

In 1966, Ford entered into a voluntary stipulation with the Commission, agreeing to reduce the daily discharge of phenol generated from the coke oven operation from 600 pounds to less than 70 pounds. Additional deep wells, a phenol recovery plant and a biological destruction process were among the methods we considered for accomplishing this steep reduction. The first two alternatives were discarded only after we had designed, built and operated a pilot plant which determined that biological destruction was feasible. This conclusion was further supported by our findings that, particularly in the summer months, as much as 80 percent of the phenol which we discharged into the Rouge River had decomposed by the time it reached the confluence with the Detroit River. On the basis of this evidence, we proceeded to design a full-scale biological plant to be located on Ford property for the treatment of our phenol-bearing waste.

After completing the design, however, it appeared to us that a more logical solution might be to see whether the Detroit metropolitan water services treatment plant could and would accept our remaining phenol waste for biological destruction. Detroit officials so agreed with the provisions, among others, that we transfer a part of our 70-pound stipulation to the city and pay an equitable additional rate for the convenience and additional services rendered.

Now, with respect to oil, the recovery system which formerly served the north half of the Rouge complex has been completely replaced by an advanced collection and removal system now entering its third year of operation.

Additionally, since May 3 of this year, an oil polishing lagoon has been operational in conjunction with the Gate 11 oil removal facilities which were installed in 1954. Owing to extensive delays in a planned relocation of the Rouge River channel by the U.S. Corps of Engineers, due to restricted Federal funding, the property which we had originally contemplated as the site of the lagoon has not yet become available to us. Fortunately we were able to purchase other suitably located land across the river for the purpose.

We believe that these improvements, supplemented by a continuing program of careful and energetic housekeeping within our plants, have given us an effective oil control system at the Rouge.

F. J. Kallin

With with respect to steel pickling liquor, for many years our steel operations at the Rouge used sulphuric acid for the removal of iron scale in its pickling operations, resulting in waste pickling liquor which was discharged to our boat slip. After studies of possible alternatives -- including disposal wells, acid recovery systems and chemical neutralization -- our Steel Division found it most feasible to switch from sulphuric acid to hydrochloric acid, which is more capable of being economically recycled and reused.

Under contract, an outside supplier now hauls from the Rouge all the spent pickling liquor generated each day. Since April 1969 there has been no disposal to the boat slip except for some incidental leaks -- which since have been completely corrected -- and small quantities of dissolved iron contained in the rinse water. Even though we are meeting our iron stipulation, we are currently designing additional facilities to prevent any loss of iron in the rinse water to the boat slip which will eliminate occasional discoloration. We expect to have this installation operating by May 1971.

Now, with regard to cyanide and phosphate at our Monroe plant, waste treatment facilities at our Monroe plant were initially installed in 1950 and were expanded in 1955 to provide for the treatment of cyanide and for the removal of chromium and nickel used in plating operations. Additional facilities operating since January 1969 have utilized chlorine to destroy cyanide and this has reduced the cyanide concentrations in wastewater to less than .025 parts per million in accordance with a voluntary stipulation entered into between Ford and the Michigan Water Resources Commission.

The above wastewater treatment facilities also enable us to meet our stipulation on oil, bacteria and phosphate.

That concludes my report on the current status of Ford Motor Company's continuing effort to improve wastewater control at its Rouge and Monroe plants. We believe that, with the exception of the short-term problem with suspended solids resulting from our air purification efforts at the Rouge, our process changes and waste treatment facilities have placed these two plants in substantial compliance with existing water quality standards and objectives. In keeping with Ford Motor Company's commitment to an improved environment, as spelled out publicly by Mr. Henry Ford II last December 1, I can assure you that our company will continue in its efforts to help achieve the goal of cleaner air and cleaner water.

Thank you again for giving me this opportunity to discuss the progress we have made.

Mr. Chairman, I have one additional comment. Yesterday, I had an opportunity to review the summary statement delivered by Mr. Harlow. On page 27 of that report, I believe the word "air" should replace the word "oil".

Making this change, the sentence would read: "The State of Michigan adopted a final order of determination at its May meeting to require further control of suspended solids resulting in part from air pollution control facilities," as opposed to oil pollution control.

MR. STEIN: Do you accept that, Mr. Harlow?

MR. HARLOW: Yes, that's right.

MR. STEIN: Thank you for that correction.

Are there any other comments or questions? And I wish we would have a few here because at least on its face, the statement we had of the status of Ford from Mr. Harlow and the statement from Mr. Kallin do not seem to completely jibe.

Let me make my point and let's see if we can get this clarified. Mr. Kallin says they are in substantial compliance. As I understand it from the Federal statement, Ford was behind. Can we resolve that somehow?

MR. HARLOW: I think the statement of Mr. Kallin was in connection with the suspended solids. And I believe it was because this filter didn't work and you went to another system that caused you to be delayed.

MR. KALLIN: That's right. And I think my statement reflects that we are not in compliance with suspended solids.

MR. HARLOW: It is good to see you again, Mr. Kallin.

MR. KALLIN: Thank you.

MR. HARLOW: On page 3 of your report, when you talk about --

MR. STEIN: Pardon. Let me get this because I think this is the key point. If you are not in compliance with suspended solids, what does that statement at the end of your report say on process changes and waste treatment facilities have placed these two plants in substantial compliance with existing water quality standards and objectives?

MR. KALLIN: But I think, Mr. Chairman, that I say that we believe that with the exception of the short-term problem of suspended solids.

MR. PURDY: Mr. Kallin, you have a number of outlets to the Rouge River from your Rouge operations. Many of these contained or did at one time contain suspended solids in excess of the requirements that have been agreed upon.

Now, are you behind time on suspended solids control on all of these outlets or only on one or two?

MR. KALLIN: No, sir. We are only not in compliance on actually two outlets. And I think that is covered somewhat, possibly not enough detail, in the first part of the presentation where we said initially we had a suspended solids resulting from the grinding and polishing of glass which has been eliminated. And the suspended solids problem we have today is the result of the air pollution control facilities which were put in. So that these two situations, the power house and the Dearborn specialty foundry, happened to drain into two separate sewers.

So, to put it another way, we have 5 sewer systems and 3 are in compliance and 2 are not, if that is helpful.

MR. HARLOW: Is the powerplant discharging through the tailrace?

MR. KALLIN: Yes, sir.

MR. STEIN: Are we in substantial agreement on the situation now?

MR. HARLOW: Yes.

MR. STEIN: What do you think is the situation in the Ford plants? Do you think they are in substantial compliance except for the air pollution scrubbers, control scrubbers?

MR. HARLOW: Well, I have one or two questions I would like to ask to explore this a little further.

MR. STEIN: Right.

MR. HARLOW: Mr. Kallin, on page 3 of your statement in connection with the oil -- and I think most of your reference here is in the oil problem from Gate 11, and you did construct a lagoon -- is this across the Rouge River now from where the Gate 11 discharge was?

MR. KALLIN: Yes, sir. What we have done is we picked up the effluent from the clarifiers which we installed back in 1954 which since that time have been discharging directly to the Rouge River. We have picked up that effluent and now carry it underneath the Rouge River to the new so-called polishing lagoon. And that went into operation May 30th this year.

MR. HARLOW: And are the discharges of these lagoons within 15 milligrams per liter of oil?

MR. KALLIN: Yes. As a matter of fact, Mr. Harlow, if we are talking about an arithmetical number, my recollection is that for the most part, the arithmetical 15 milligrams per liter, we were attaining with the clarifiers as they were. However, we recognize that there was still oil coming out of them. That's why we have gone the extra step. And we think this is going to make a significant improvement to the water quality going into the Rouge.

MR. HARLOW: Now, what I recall, I think, was Willow Creek outfall where most of your oil from your rolling mills came out.

MR. KALLIN: No, most of the oil from the rolling mills came out to this Gate 11 system, that system against the southwest half of the Rouge plant.

MR. HARLOW: Back at the end of the Ford slip where you had the skimmers, are these skimmers still in operation?

MR. KALLIN: Yes, sir.

MR. HARLOW: Are they working satisfactorily?

MR. KALLIN: Yes.

MR. HARLOW: So you are able to meet your stipulation for oil which I believe says measuring just the other side of the skimmer?

MR. KALLIN: Yes, sir.

MR. HARLOW: And that is within the compliance?

MR. KALLIN: Yes, sir.

MR. HARLOW: Now, in connection with the cyanides at the Monroe plant, the stipulation also calls for meeting 25 pounds per day.

MR. KALLIN: Yes, sir.

MR. HARLOW: Your estimate refers to just concentration units, but are you also meeting the 25 pound per day for cyanide?

MR. KALLIN: Yes, we are. What we are actually doing is chlorinating down to zero cyanides. So it is well less than 25 pounds.

MR. HARLOW: I have no further questions.

MR. STEIN: Any other questions or comments?

MR. O'LEARY: I have one question.

On page 3, Mr. Kallin, on your phenol operation, you have stated this part of an agreement with Detroit would be to transfer part of a 70-pound stipulation to the city. Has that been accomplished or what?

MR. KALLIN: No, it has not. And I think that is an arrangement, if you will, between Detroit and Ford. In other words, it was since Detroit was going to offer this service, since we can get down well below 70, it appeared logical to transfer a portion of this amount to Detroit.

MR. O'LEARY: I mean Detroit would be allowed to discharge more phenol, is this the meaning?

MR. KALLIN: I would assume so. In other words, if Detroit has an arithmetical limitation as we do, the end result on the river would be the same, but the source would be from one location as opposed to the two locations.

MR. PURDY: Mr. Stein.

MR. STEIN: Yes, Mr. Purdy.

MR. PURDY: There seems to be a slight point here, I believe, that needs some clarification. And that is that the Ford Motor Company will be discharging a part of their phenol-bearing waste to the Detroit system. And in recognition of this, the Ford Motor Company will transfer a part of their allocated load to the river to the city of Detroit in consideration of this treatment that Detroit will provide.

MR. STEIN: Any other questions?

MR. HARLOW: I have one more question, Mr. Chairman.

Mr. Kallin, in getting back to oil a little bit. the stipulation also calls, in reference to oil wastes from Ford, that there not be visible film of oil on the surface of the waters. Do you think that the 15 milligrams per liter is sufficient to prevent any film of oil on the water surface?

MR. KALLIN: I think that we have specifically with respect to the Rouge because of the full concentration of minute quantities of oil that accumulate, again referring to Gate 11, to really get rid of all the oil. Essentially we have seen, of course, a decided improvement in the oil problems in the river. And we haven't had a chance yet since May 3 to really on either a short-term or a long-term look to see what the extent of the benefits we are going to get from this new facility are. We have high hopes for it.

MR. STEIN: Any other comments or questions?

MR. PURDY: I have one question, Mr. Stein. I will comment first.

And that is, of course, with respect to Gate 11 sewer and the 15 ppm oil concentration, the Water Resources Commission recognized that to correct the problems of oil accumulation in the Rouge River that we would have to look at an effluent that would have less than 15 ppm oil in the Gate 11 outlet. And this is why the stipulation calls for no visible film of oil. We recognize that at 15 ppm, you can have a very slight slick.

Now, with respect to the Gate 11 sewer, I might ask Mr. Kallin if at the time that the flood control project is completed on the Rouge River, do you have plans to still add additional facilities?

MR. KALLIN: Mr. Purdy, the effluent from the lagoon now goes into the portion of the river which will be vacated by the flood control channel. We do have provisions made in the Corps contract to use that portion of the river for further treatment.

MR. PURDY: So that as soon as the flood control project has been completed to the point that this part of the channel can be released to you, you will add a, so to speak, second polishing lagoon.

MR. KALLIN: Yes, sir.

MR. STEIN: Thank you.

Are there any other comments or questions? Are we all satisfied with the progress report now or is there any problem?

(No response.)

Thank you, Mr. Kallin, for a complete statement.

I think it might be helpful -- and I just throw this out and maybe we can think about this -- if we ask our people, in conjunction with the State people, perhaps, to have an inspection of Ford, since you are one of the principal ones named. In this case, perhaps a joint statement of the facts of the situation, including a prognosis, can be prepared and agreed upon among Ford, the State of Michigan and the Federal Water Quality Administration. This will be laid out so that we can all agree upon a statement of the conditions.

I think this will be helpful to all because if the situation is substantially cleaned up -- and we are just dealing with minor problems now -- I think we should state that for all to see and lay it out if that is a fact.

MR. PURDY: We would be pleased to make those arrangements.

MR. STEIN: Thank you very much, Mr. Kallin.

Mr. Purdy.

MR. PURDY: Mr. Balden, Chrysler.

STATEMENT OF AL R. BALDEN
WASTE TREATMENT SPECIALIST
ENGINEERING OFFICE
CHRYSLER CORPORATION, DETROIT, MICHIGAN

MR. BALDEN: Mr. Stein, conferees, ladies and gentlemen, it is a pleasure for me to appear before you to make a brief statement.

My name is Al Balden and I am the Waste Treatment Specialist for Chrysler Corporation which has three manufacturing plants on the Detroit River, all in the vicinity of Trenton, Michigan. These plants are:

1. The Amplex Division's Trenton plant, built in 1953, which sinters small metal parts.

2. The Chemical Division's Trenton plant, built in 1947, which makes industrial adhesives, brake linings, machining coolants, cleaners and the like.

3. The Trenton engine plant, built in 1951, which machines engine components and assembles these into engines.

It has been basic to Chrysler's operating philosophy that protecting the quality of our environment is an integral part of the cost of making a product. We have designed and built plants to protect our waterways from degradation, as contrasted with the more limited approach of meeting the requirements of the law. We have always tried to anticipate potential pollution and its ecological effects and have solved the problems presented to the best of our ability, based on the best technological knowledge currently available. As we have learned more, we have applied this knowledge. Each plant built has represented the accumulated experience applicable to that problem. Those of us associated with the designing, building and surveillance of such equipment have become firm believers in the validity of Murphy's Law. We have seen things happen which are unanticipated and have constantly worked to eliminate the unexpected.

Each production plant built by Chrysler in the Trenton area varies considerably in reference to the manufactured product and therefore the manufacturing operations and the types of wastes produced. We have worked closely with the Water Resources Commission staff during the design of the waste treatment facilities, discussing the plant operation and the types and volumes of contaminants to be treated and removed as well as the proposed facilities for accomplishing the desired pollution prevention.

At the Amplex plant, the potential pollutant was free oil and a retention pond with a weired overflow with a drum skimmer upstream of the weir has been effective in preventing loss of the oil.

The chemical plant was recognized to have a problem due to small but anticipated losses of oils, solvents and the like during the transfer of raw materials from the delivery truck to holding tank and while pumping the final product from the mixing tank to the shipping conveyance. A lagoon was constructed to catch and hold this drainage. The floating material was periodically pumped to a truck and hauled to an incinerator. The aqueous portion was pumped to a drying bed. Due to operational errors, this procedure has not been entirely effective in preventing pollution, so additional equipment is to be installed to provide an effective remedy. We have entered into a voluntary stipulation with the State to have these facilities in operation by April 1, 1971.

It was recognized that the Trenton engine plant would have a serious pollution problem because of the many machining and cleaning operations performed. For this reason, waste treatment facilities were included as part of the plant as built. These represented the most advanced technology known and were quite acceptable at that time -- 1951. They consisted of a large holding tank followed by air flotation and included means of recovering oil.

As we learned more about the limitations of our equipment and as the effluent demands became more exacting, it was evident that additional facilities were required. A completely new tertiary treatment plant was installed in 1967, consisting of primary oil skimming, air flotation and final settling. This plant has enough flexibility to satisfactorily treat a variety of wastewaters and its operation has been completely satisfactory as reflected by the reports sent to the Water Resources Commission.

The greatly increased public awareness of threats to the quality of our environment can be beneficial in many ways. We hope one positive result will be an increased awareness in the cause and effect of thoughtless actions by people who handle industrial pollutants as well as their daily job. New and stricter laws can be enacted and they will be effective, but only to a point. They will always fall short of their full potential until each man and woman in their roles as employees and citizens of this society become fully committed to his surrounding environment. The installation of adequate facilities must be matched by intelligent individual commitment to their use.

MR. STEIN: Thank you, Mr. Balden.

Are there any comments or questions?

(No response.)

Mr. Balden, I would like to take this opportunity to commend you in particular and Chrysler because it has been my experience that under your direction, Chrysler Corporation has taken cognizance at least of water pollution problems in the country. For an industry faced with major potential pollutants, it has been always cooperative with Federal, State and local governments in putting in these devices.

And I think if other companies had had the policy, and perhaps had had the leadership of someone like Mr. Balden, we wouldn't have this problem today.

I don't know about one area. And Mr. Lyon may want to listen to this. You don't find this all over the country. How are you doing in the Delaware River Basin?

MR. BALDEN: Fine. We have no problems there that I am aware of.

MR. STEIN: O.K.

MR. BALDEN: We have been in close touch with the people in Delaware, and they seem to be happy.

MR. STEIN: Oh, I know they are happy, but I don't know how happy that water is.

All right, thank you.

Mr. Purdy.

MR. PURDY: Mr. Stein, I would like to call on now

Mr. Gerald Remus, the General Manager of the Detroit Water Board, to describe to the conference the largest single system of intercepting sewers and wastewater treatment plants that has ever been placed under construction in the State of Michigan. And I think it is also the largest single system of intercepting sewers and waste treatment that has ever been placed under construction in any part of the U. S. section of Lake Erie.

Mr. Remus.

STATEMENT OF GERALD J. REMUS

GENERAL MANAGER

CITY OF DETROIT METROPOLITAN WATER DEPARTMENT

MR. REMUS: Thank you, Mr. Purdy.

Mr. Chairman, members of the conference, I am Gerry Remus, General Manager of the Detroit Metropolitan Water Department.

We had prepared a report which after sitting here for a day and a half now, I would like to comment on rather than read because there are some points that come up that seem to me need to be clarified.

MR. STEIN: Mr. Remus, how about my putting the whole report in the record as if read? We may have a few problems with your map. If we put it in, it will probably have to appear in black and white and will not have the insert. We may have to push it down.

And I do not know if we can reproduce these pictures, Gerry.

MR. REMUS: We can probably get you the pictures.

MR. STEIN: The pictures, we have here. But unless we can get the originals, we may want to eliminate the pictures. If you want them in, you will have to have other things to help us.

MR. REMUS: I have no personal feeling on the pictures except to establish that the entire effort as far as I am concerned is dedicated to the fact we are not going to be talking about how lousy things are, which we have heard enough of in the last day, but rather what construction we have under way and what progress we have made and are hoping to make provided we can keep cooperative efforts going.

(The above-referred to report follows in its entirety.)

REPORT TO THE
CONFEREES ON INTERSTATE LAKE ERIE
FEDERAL-STATE POLLUTION ABATEMENT PROGRAM

BY

G. REMUS, GENERAL MANAGER
DETROIT METRO WATER DEPARTMENT

JUNE 3, 1970

June 3, 1970

Conferees on Interstate Lake Erie
Federal-State Pollution Abatement Program

Gentlemen:

Since I last reported to this Conference on June 27, 1969, I am happy to report substantial progress toward meeting our mutual goal of pollution abatement in the Detroit River and Lake Erie.

Projects which were nearing the construction stage a year ago are under construction, and projects under construction a year ago are basically completed and beginning to show results. Work totaling $74 million, including engineering costs, is under construction now. Another $90 million worth of contracts will start this year.

The progress to be described applies to all or parts of a regional sewage disposal system now serving about three million persons in Detroit and 54 suburban communities. We have contracted to serve an additional 15 communities and the remaining portions of another two already in the system. Contracts to serve 12 more are under consideration.

The regional Sewage Treatment Plant serving these communities is currently treating an average daily flow of 750 million gallons, a rate which is steadily increasing as development continues in the present service area.

Progress will be described in five areas: (1) Installation of advanced treatment facilities in our Sewage Treatment Plant; (2) Extension of the regional interceptor system; (3) Improvements in storm water overflow control; (4) Other pollution preventive measures, and (5) Contracts which we intend to award by the end of 1970. The photographs attached indicate the size and scope of some of the current projects (Exhibit A).

I. ADVANCED TREATMENT

Last year we reported design criteria for phosphate removal and biological treatment facilities, based on almost two years of operation of our pilot treatment plant. Today we can report successful full-scale soluble phosphate removal, substantial reduction in coliform bacteria, and a major innovative change in design of our biological treatment process. The charts attached indicate our projected removal capabilities as we complete projects (Exhibit B).

A. Phosphate Removal

On March 30 of this year we began measured injection of waste ferrous chloride into the two interceptors which carry sewage into the Sewage Treatment Plant. Since then, the two-month average of orthophosphate in our effluent has been less than 21,000 pounds per day maximum contained in our stipulation with the Michigan Water Resources Commission.

A. Phosphate Removal (Continued)

The Department is currently using the entire output of ferrous chloride from Great Lakes Steel's Ecorse Plant. Indications are that eventually other sources will have to be found. The Department transports the ferrous chloride to two 150,000-gallon storage tanks at the plant. Currently, injection of 10 - 15 milligrams of iron per liter of sewage influent is adequate to meet the poundage stipulation.

B. Coliform Bacteria

The bacteria count in our effluent is approaching the stipulated level of 1,000 per 100 milliliters. But bacterial pollution from the Rouge River is wiping out the value of this reduction to the River, samplings downstream indicate.

C. Biological Treatment

Last year we reported our intent to construct a step-feed activated sludge process, incorporating enough flexibility to deal with daily and long-term changes in quantity and quality of sewage influent.

While design continued, our engineers studied the possibility of substituting pure oxygen for air in the proposed aeration tanks.

Potential advantages of oxygen aeration appeared to include doubling capacity of an aeration tank of a given size with resultant long-term savings in operating and capital expense (including acquisition of less land), reduction in odor and greater ease of sludge handling. Disadvantages appeared to be the possibility that the process might not live up to its claims, plus short term higher expenses for operation and construction

C Biological Treatment (Continued)

Earlier this year, we decided to test the process on a plant-sized scale. Plans call for one-half of the first aeration module to use the oxygenation system and the other half to use a conventional aeration system. The dual flow train system will provide invaluable cost and operational comparisons for the benefit of future Department expansion and for the benefit of other agencies involved in water pollution control.

The Department expects to save about $6 million in construction expense by 1975 if both tanks use oxygen to treat 600 million gallons of sewage per day in the biological process, with a savings in annual operating expense of more than $200,000 if the Department builds its own oxygen plant.

Contracts for this first module of biological treatment are to be awarded by the end of this year.

II. REGIONAL INTERCEPTOR SYSTEM

The Department for more than a decade has stressed the need for a regional approach to the regional problem of water pollution. Our earliest proposals were given impetus by growing Federal and State emphasis on regional solutions for a variety of governmental efforts. This emphasis has led to Federal and State recommendations for a single regional Sewage Treatment Plant to serve all or portions of Wayne, Oakland and Macomb Counties. The attached map, "Water Pollution Control Program" shows our proposed regional interceptor system capable of serving the region's needs past the year 2000.

Today a major portion of the initial construction of the Detroit Metro Water Department's Oakland-Macomb Interceptor system in Macomb County is under way When completed, the initial and future interceptor arms will serve all of Macomb County and much of northern Oakland County -- an ultimate population of 3. 4 million -- and will allow the phase-out of all existing treatment plants whose effluent is currently tributary to the Clinton River.

III STORMWATER OVERFLOW CONTROL

On May 25 of this year, a short intense thunderstorm moved southeast across Detroit dropping an average of 0. 47 inches of rain over the area in 45 minutes, and as much as 0. 95 inches on some parts in a similar time period. Interceptor gradients had already been lowered in anticipation of thundershowers predicted by the U. S. Weather Bureau, and the Department's Systems Control Center was poised for action.

First direct warning of rainfall came from a remote-registering rain gauge seven (7) miles west of the city, 15 minutes before the first sprinkles reached another rain gauge inside the city.

About one billion gallons fell over Detroit, and about 450 million gallons entered the sewer system Yet so much stormwater was retained that overflows into the Detroit and Rouge Rivers were fewer in number and of shorter duration than usual. The Sewage Treatment Plant processed about 365 million gallons over average flow during the following 30-32 hours, with no further rainfall

Retention of this storm in our combined sewers was one of the most dramatic demonstrations of a rainfall and sewer monitoring system whose nucleus is now nearing complete installation.

The system and the Department's ability to interpret and to make decisions based on the system's reporting was so finely tuned by May 25, that the Systems Control Center was able to tell a manned storm pumping station to contain part of the storm in the system above it -- rather than to start pumping polluted stormwater into the Detroit River to protect basements. Rain gauges and sewer level gauges upstream from the pumping station had indicated that the storm had nearly spent itself by that time. Many other rapid decisions were made during that storm to reduce overflows.

Financed with a $1 million Federal grant, the $2.1 million project includes 14 telemetering rain gauges, four of them located in suburbs to the northwest, 80 sewer level gauges in combined sewers, 40 level gauges in interceptors, 71 overflow indicators at backwater gates and remote-control capabilities at seven sanitary and stormwater pumping stations.

The system for the last year has enabled us to learn more about the relationships of rainfall, sewage levels and overflows to the Rouge and Detroit Rivers, and it has enabled us to reduce the occurrence and volume of overflows as indicated in the narrative above.

The Department is in the process of working out a similar program for all of Southeast Michigan.

Ultimately, we realize, more effort and money must be expended to provide even more control of overflows. The Water Resources Commission has called for substantial control by 1977. But the experience and knowledge of our sewer system gained from the new data, coupled with results of other demonstration projects such as ours, makes us confident we can come up with good solutions to stormwater overflow reduction.

IV. OTHER POLLUTION PREVENTION

All industries in our sewage disposal system discharge treatable wastes into the system and must pretreat or dispose of elsewhere wastes incompatible with our system. The Department now requires an inspection manhole at the connection of an industrial sewer lead to they system. Industries have responded well to our industrial waste control program. Chrysler Corporation has installed two waste oil treatment installations at locations within our service area and is transporting waste oil from other plants to the new installations. Detroit Diesel Engine Division of the General Motors Corporation also has built a pretreatment facility and plans further work. Other work is planned or in progress at plants of Ford Motor Company, more GM plants, Budd Company, Marathon Oil and others.

Recent efforts of the industrial waste control team have been directed toward pretreatment of oil. Greater emphasis in the future will be placed on preventing cyanides, chromium and other heavy metal wastes from entering the system.

The Department has urged that other pollutants as well should be kept out of the sewer system -- street cleaning rather than waiting for rains to wash leaves, dirt and grit into our sewers would result in a net savings to the city, for example.

Although some detergent manufacturers have announced sale of low-phosphate or phosphate-free products in the near future, we feel that action is necessary at the Federal and State levels to encourage this trend. Detroit Common Council recently urged the State to legislate a phosphate limit of 10 to 15 percent in detergent products sold in Michigan.

Regarding a pollutant of immediate regional concern, sampling of our raw water shows no native mercury, and if there were some, our treatment process would take care of it.

Our testing procedures, supported by Michigan Public Health Department and the Federal Water Quality Administration, are accurate to two parts per billion. Our Sewage Plant effluent likewise shows no mercury.

V. PROGRAM COSTS

Transmitted by our letter of June 3 is a copy of "Engineering Division Monthly Report -- Status of Contract Work Ending April 30, 1970." That report lists pollution control program construction contracts totaling nearly $71 million. Total cost of the work is $74 million including engineering and contingencies. Not listed is an additional $3 million spent for treatment plant site acquisition.

Work programmed for construction starts this year are as follows:

PCI-15	15-Mile Road Interceptor	
PC-231	Primary Influent Sampling	
PCI-10A	Oakland Arm -- Section III A	
PCI-10B	Oakland Arm -- Section III B	
PC-239	Connecting Interceptors and Control Facilities	
	SUBTOTAL (including engineering and contingencies)	$ 9,900,000
PC-222	Four Final Tanks	
PC-233	Aeration Module I	
PC-234	Intermediate Pumping Units	

Construction Starts This Year -- Continued

PC-235	Blower Units
PC-236	Transformers
PC-237	Switchgear
PC-243	Avon-Dequindre Control Facility
PC-244	Oil Storage Relocation
PC-245	Scum Disposal and Incineration
PC-246	Sludge Filtration and Incineration
PCI-12	Romeo Arm -- Section I

SUBTOTAL (including engineering and contingencies)	$80,000,000
TOTAL cost of contracts to be awarded in 1970 -----	$89,900,000

Work programmed for construction starts in 1971 through 1974 has been estimated to cost approximately $290 million.

VI. FINANCING

Inflation is crunching us between our pollution control program commitments and our ability to finance them. The cost of our interceptor construction and the first phase of upgrading our treatment plant was originally estimated at $104 million. For the past couple of years we have planned to spend about $159 million for approximately the same work, but as of now, the cost of the work has risen to about $180 - 200 million, and our financing for the two years' worth of work remains locked in at about $159 million. Something has to give in that kind of situation, and the only source that hasn't given much to date is the Federal Government.

Again, we must question the sincerity of the Federal Government's war on pollution in light of legislation providing Federal funds for 55 percent of our projects when it has actually provided only 5 percent or less.

The Government is getting good at calling attention to water pollution problems. But one of the biggest water pollution problems of 1970 appears to include those responsible for our national priorities and specifically, those who propose that the Government can accomplish $10 billion worth of pollution control with an expenditure of $4 billion.

That kind of seed money doesn't go very far, as Michigan has found out. Voters of this state approved a $335 million clean-water bond issue in November, 1968, after they were told that the $335 million could seed four times that much in statewide pollution control projects -- hinging on Federal grants ranging from 30 - 55 percent. With state and local funds now required to "prefinance" the absent Federal money, both state and local funds are running short.

On May 12, 1970, we paid an all-time high interest rate of 7.78 percent on a sewer bond issue of $24 million. The total interest cost on the bond issue will be about $44 million. If our bonds had been sold in 1968, the interest rate would have been about 5 percent, at a savings in interest cost of about $15 million.

What is ironic is that $20 million of the $24 million was to pick up the financing for the Federal Government.

Are we on schedule? We are, although the program is not. Our pollution control construction program ultimately has been scheduled by the availability of Federal and State funds, and shortfalls and delays in these funds have produced corresponding delays in our construction program.

In summary then Detroit this year is building $164 million worth of improvements to its interceptor and treatment systems and the programs going on now are bigger and bolder than those in any other population center on the Great Lakes.

We have recognized the problem of stormwater overflows and we're building up the knowledge and expertise we will need to solve them in the most expeditious and economical manner

But we're beginning to be concerned now with how to finance the 1971 - 1974 construction phase Due to the lack of Federal funds in the last two years there will be no State funds to help us out and if recent Federal announcements are any guide no more than a dribble of Federal funds will be available.

That 1971 - 1974 construction phase is vital if we're to solidify the benefits from the present construction.

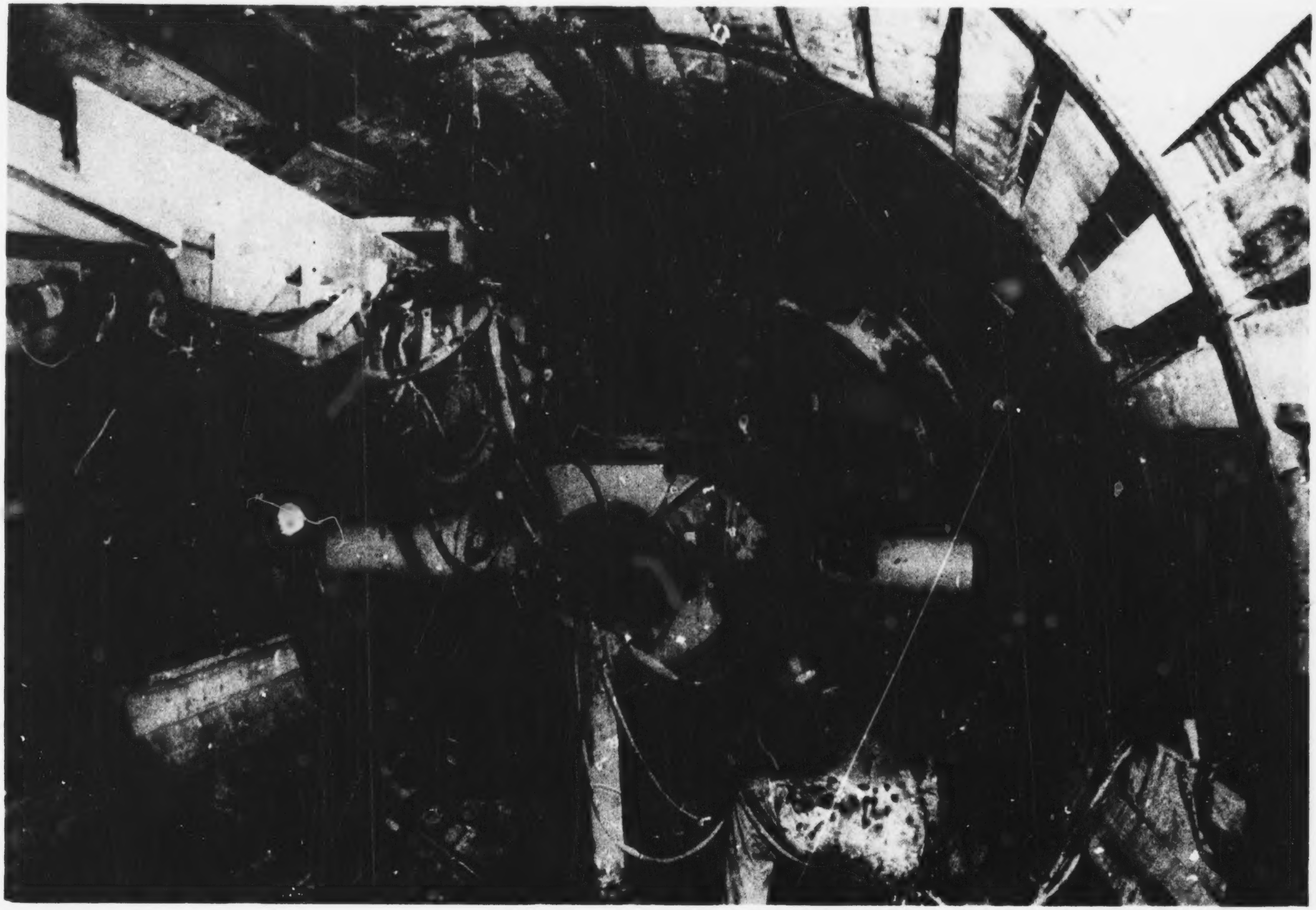
Respectfully submitted

Remus

G. Remus
General Manager

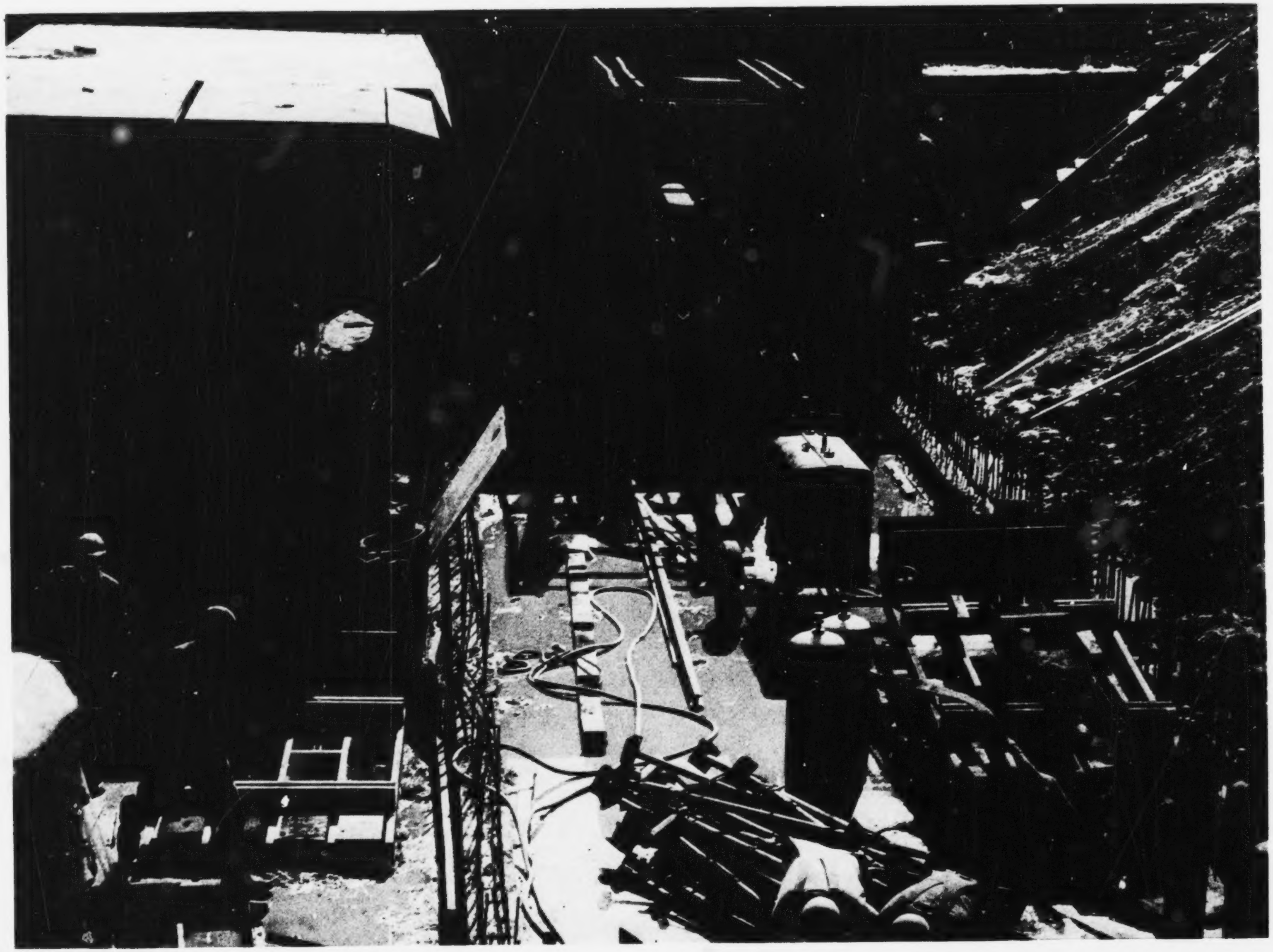
Construction of two additional primary sedimentation tanks, each 250 feet in diameter and 11 to 28 feet deep, will add 300 million gallons per day to the Sewage Treatment Plant's primary capacity. Work on this contract started on January 19, 1970.

Exhibit A



Oakland-Macomb Interceptor will carry sewage from Oakland and Macomb Counties through conduits 8 to 12 feet in diameter into Detroit's sewage disposal system. Diameter of interceptor above is 8 feet, 9 inches. Work on this contract began on February 20, 1970.

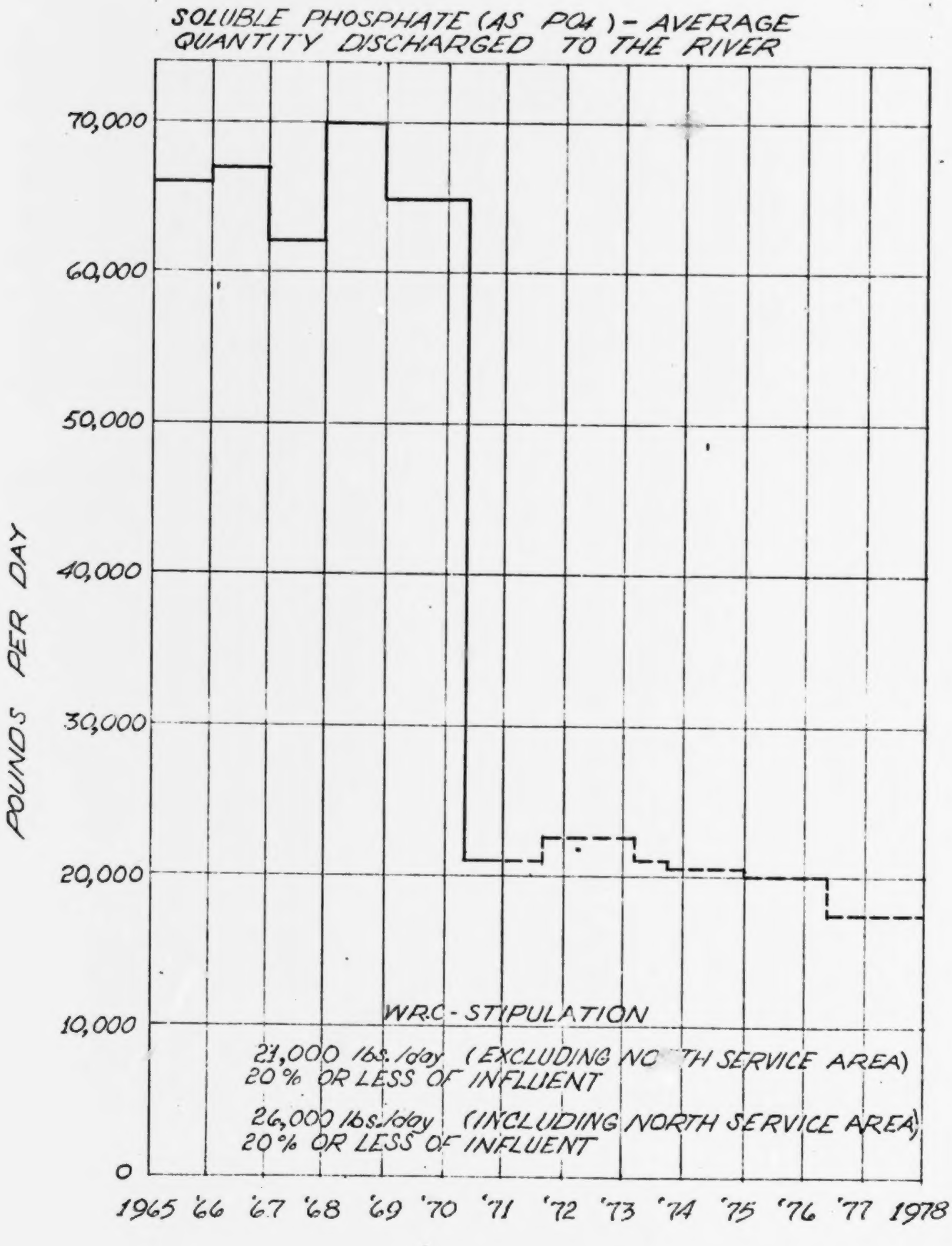
Exhibit A



Primary effluent conduit will carry primary flow either to advanced treatment, or in storm conditions, to outfall. Capacity with existing conduits will be 1,200 million gallons per day. Work began on January 21, 1970.

Sheet piling marks the site of half of a chlorine contact conduit being built to carry effluent from advanced treatment facilities to Detroit or Rouge Rivers. The second half of the conduit will be built to right of picture. Capacity of conduits will total 1,200 million gallons per day. Work on the contract started on February 13, 1970.

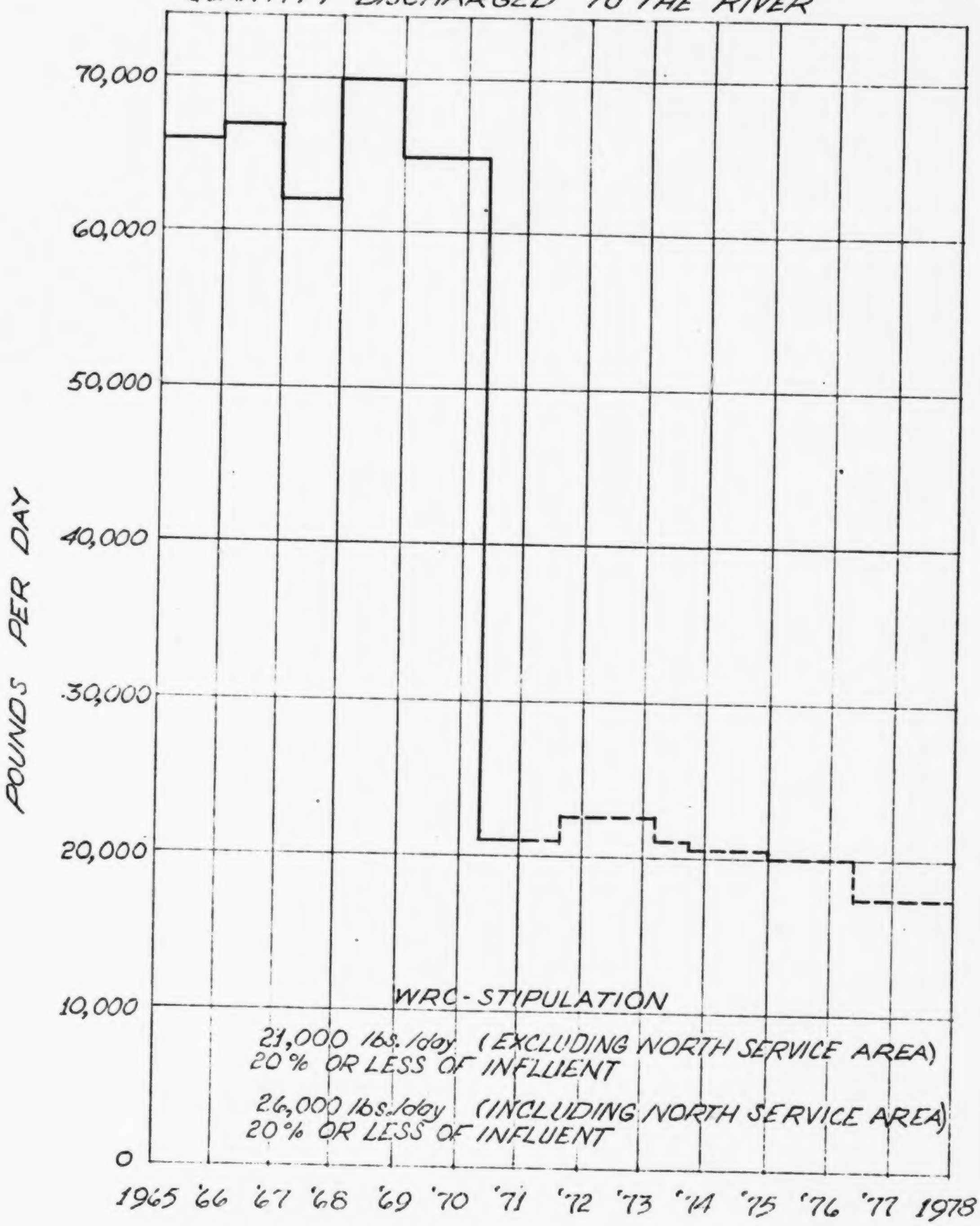
Exhibit A



DMWD SEWAGE PLANT - PROJECTED POLLUTANT REMOVAL

Exhibit B

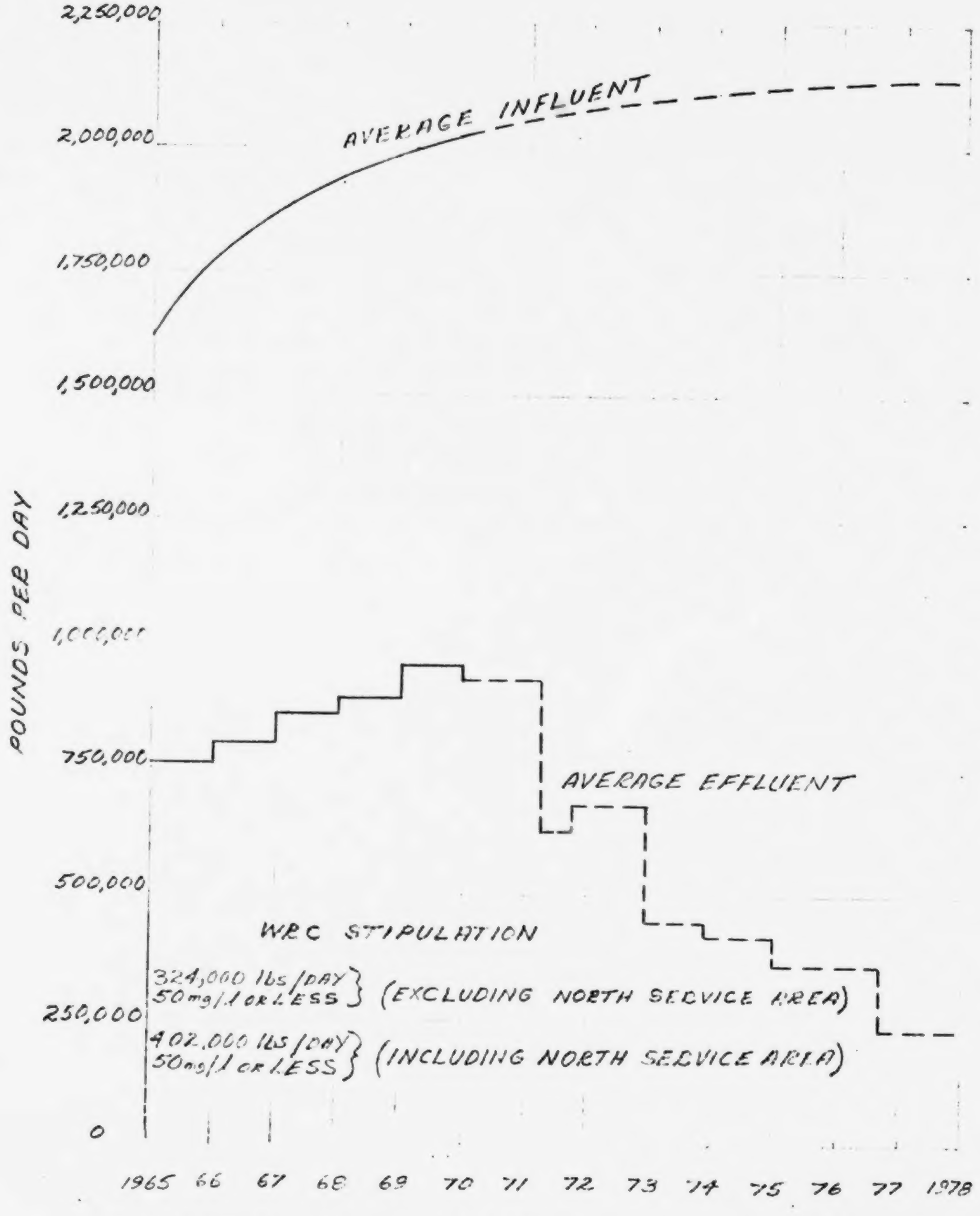
SOLUBLE PHOSPHATE (AS PO4) - AVERAGE QUANTITY DISCHARGED TO THE RIVER



DMWD SEWAGE PLANT - PROJECTED POLLUTANT REMOVAL

Exhibit B

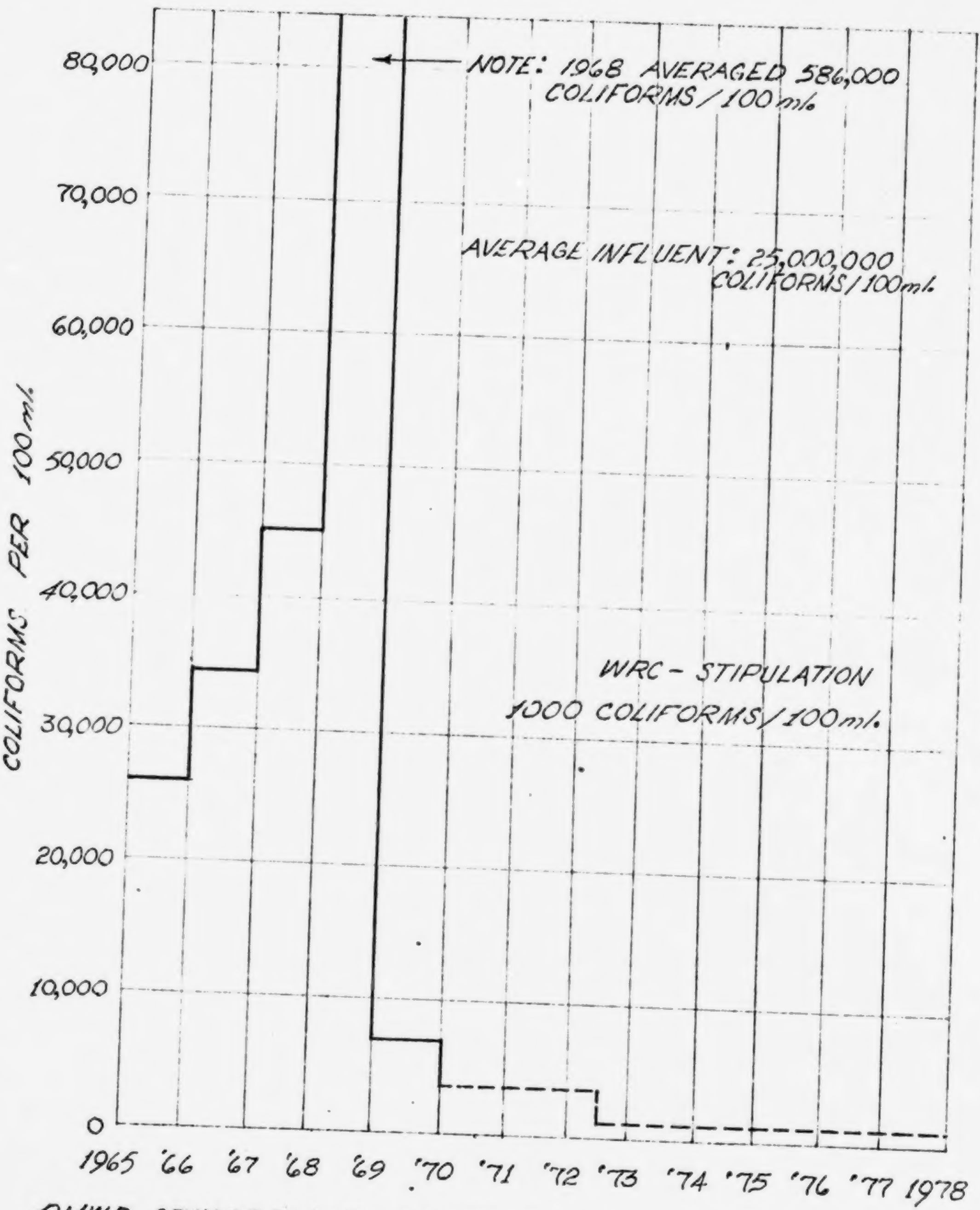
SUSPENDED SOLIDS - AVERAGE QUANTITY DISCHARGED TO THE RIVER.



DMWD SEWAGE PLANT - PROJECTED POLLUTANT REMOVAL

Exhibit B

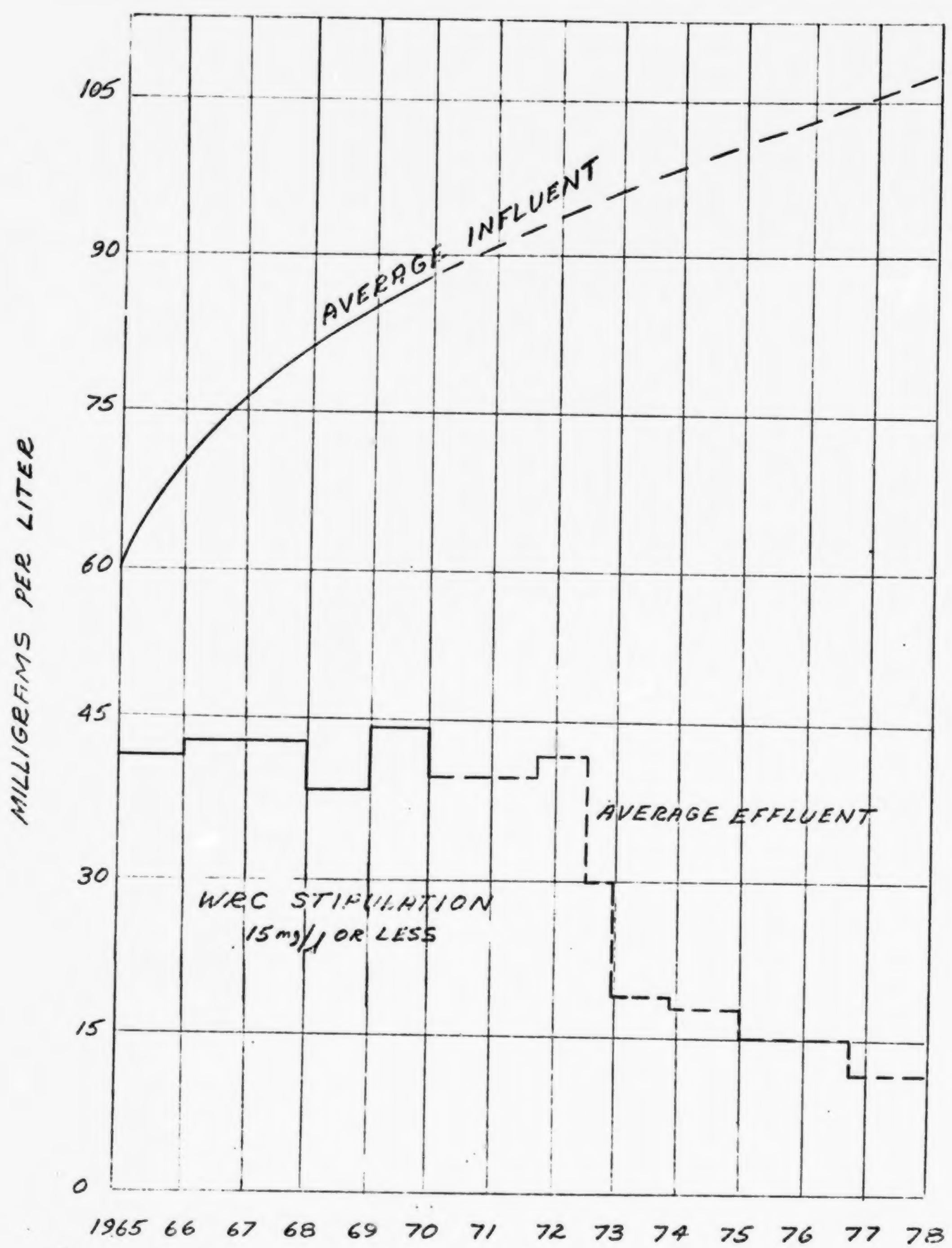
COLIFORMS - AVERAGE QUANTITY DISCHARGED TO THE RIVER PER DAY



DNWD SEWAGE PLANT- PROJECTED POLLUTION REMOVAL

Exhibit B

OIL - AVERAGE QUANTITY DISCHARGED TO THE RIVER



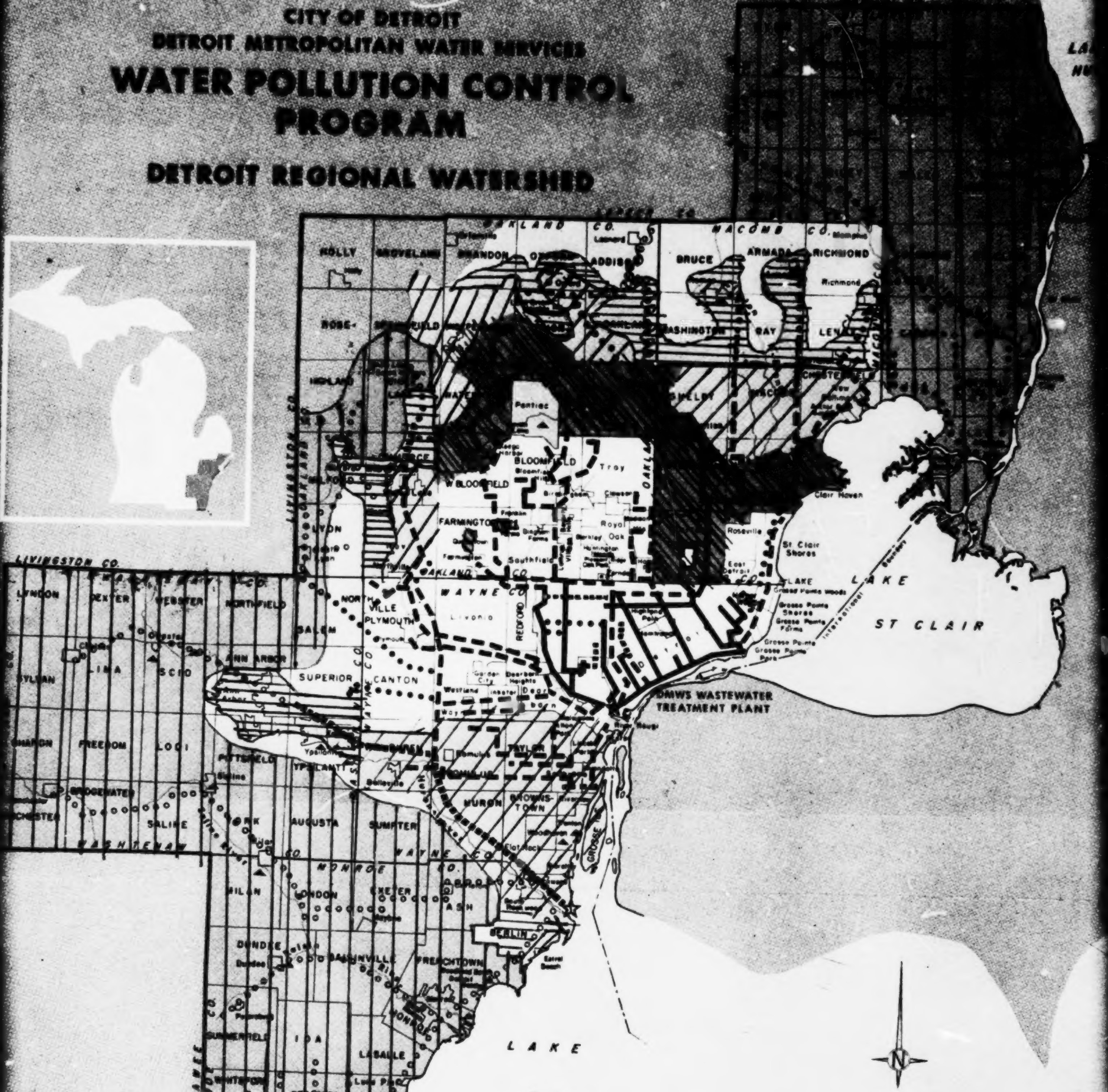
DMWD SEWAGE PLANT - PROJECTED POLLUTANT REMOVAL

Exhibit B

CITY OF DETROIT
DETROIT METROPOLITAN WATER SERVICES

WATER POLLUTION CONTROL PROGRAM

DETROIT REGIONAL WATERSHED


OAKLAND CO.
MACOMB CO.
LIVINGSTON CO.
WAYNE CO.
WASHTENAW CO.
MONROE CO.
LENAWEE CO.
HOLLY
GROVELAND
BRANDON
ADDISON
BRUCE
ARMADA
RICHMOND
Richmond
WASHINGTON
RAY
LENOX
SHELBY
Pontiac
BLOOMFIELD
W BLOOMFIELD
Troy
FARMINGTON
Southfield
Royal Oak
Roseville
St Clair Shores
Clair Haven
NORTHFIELD
LYNDON
DEXTER
WEBSTER
SALEM
NORTHVILLE
PLYMOUTH
Livonia
REDFORD
ANN ARBOR
SYLVAN
LIMA
SCIO
SUPERIOR
CANTON
Westland
Garden City
Dearborn Heights
SHARON
FREEDOM
LODI
PITTSFIELD
YPSILANTI
ROMULUS
TAYLOR
BRIDGEWATER
SALINE
YORK
AUGUSTA
SUMPTER
HURON
BROWNSTOWN
MILAN
LONDON
EXETER
ASH
BERLIN
DUNDEE
RAISINVILLE
FRENCHTOWN
MONROE
IDA
LASALLE
SUMMERFIELD
WHITEFORD
BEDFORD
ERIE
Grosse Pointe Woods
Grosse Pointe Shores
Grosse Pointe Farms
Grosse Pointe Park
DMWS WASTEWATER TREATMENT PLANT
LAKE ST CLAIR
LAKE ERIE
International Boundary
N
SCALE IN MILES

OCT. 1969

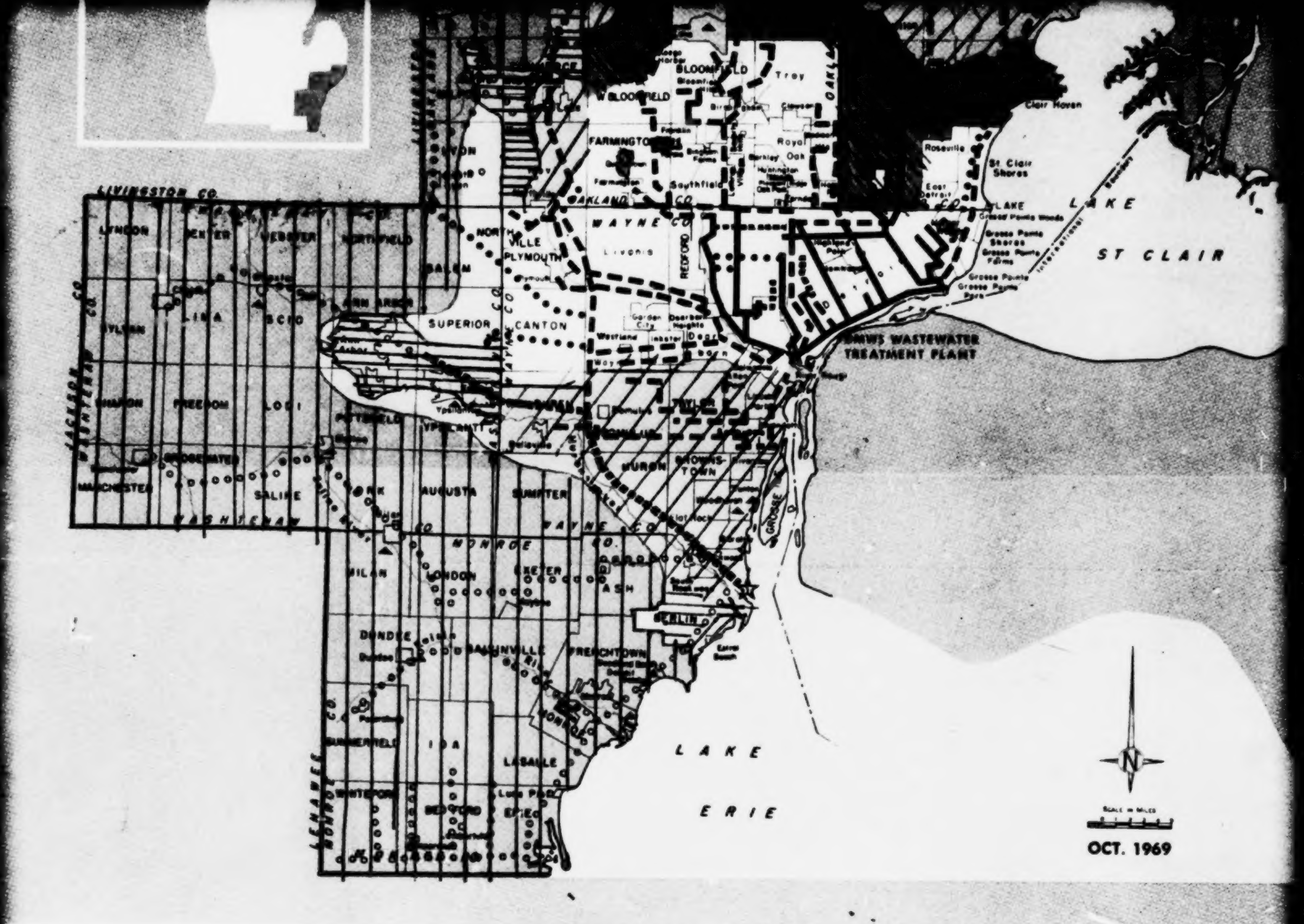
sanitary sewage interceptor network d on the above map represents only rtion of the total regional pollution program. Equally important is the addition of treatment tanks and ent at the Wastewater Plant at 9300 rson Avenue in Detroit. The site has xpanded by 27 Acres primarily to an advanced treatment process

an improved storm water overflow control system to be in effect by 1977. Within the City of Detroit, extensive renovation and improvement of the local collection system is also planned.

The construction schedules, routes and locations of all work depicted on the map

LEGEND **Program Timetable**

PERIOD	SERVICE AREA	CONSTRUCTION	
Existing		▬▬▬	by DMWS
		▬ ▬ ▬	by Other



LIVINGSTON CO.
WASHTENAW
WAYNE CO.
OAKLAND CO.
MONROE CO.
LENAWEE CO.
JACKSON CO.
LYNDON
DEXTER
WEBSTER
NORTHFIELD
SALEM
NORTHVILLE
PLYMOUTH
LIVONIA
REDFORD
SYLVAN
LIMA
SCIO
ANN ARBOR
SUPERIOR
CANTON
SHARON
FREEDOM
LODI
PITTSFIELD
YPSILANTI
ROMULUS
TAYLOR
HURON
BROWNSTOWN
MANCHESTER
BRIDGEWATER
SALINE
YORK
AUGUSTA
SUMPTER
MILAN
LONDON
EXETER
ASH
BERLIN
DUNDEE
RAISINVILLE
FRENCHTOWN
MONROE
SUMMERFIELD
IDA
LASALLE
WHITEFORD
BEDFORD
ERIE
BLOOMFIELD
W. BLOOMFIELD
FARMINGTON
Southfield
Troy
Royal Oak
Roseville
St Clair Shores
East Detroit
DMWS WASTEWATER TREATMENT PLANT
LAKE ST CLAIR
LAKE ERIE
GROSSE ILE
N
SCALE IN MILES
OCT. 1969

The sanitary sewage interceptor network depicted on the above map represents only one portion of the total regional pollution control program. Equally important is the massive addition of treatment tanks and equipment at the Wastewater Plant at 9300 W. Jefferson Avenue in Detroit. The site has been expanded by 27 Acres primarily to facilitate an advanced treatment process which is to remove a high proportion of suspended solids, B.O.D. (oxygen depleting wastes), phosphates, oils, phenols and bacteria.

Expenditures by 1970-71 for treatment plant and interceptor work are estimated at $159,000,000.

Other work which cannot be depicted on the map includes preliminary work toward an improved storm water overflow control system to be in effect by 1977. Within the City of Detroit, extensive renovation and improvement of the local collection system is also planned.

The construction schedules, routes and locations of all work depicted on the map are subject to acquisition of right-of-way, subsequent development or discovery of surface or subsurface obstructions, and population growth patterns.

The service areas shown will be developed provided that service contracts are made with the constituent communities. The layout shown basically provides the most economical solution for water pollution control for the area watershed.

LEGEND **Program Timetable**

PERIOD	SERVICE AREA	CONSTRUCTI
Existing		——— by DM — — — by Oth
by 1970-71	▨	——— by DM ■■■■■■ by Oth
by 1980	▧	— — — by DM • • • • • • • by Oth
by 1990	▤	■■■■■■■■ by DMV ∿∿∿∿∿∿ by Oth
by 2000		• • • • • • • by DM
after 2000	▥	○ ○ ○ ○ ○ ○ ○ by DM

☆ Future DMWS Wastewater Treatment Plant

★ Existing DMWS Wastewater Treatment Plant

▲ Existing Wastewater Treatment Plant to be phased out as interceptors become available

MR. REMUS: I would like to get the Federal record corrected once and for all that this is not Detroit system. It is Metropolitan Detroit system. And it creates very much of a misunderstanding, when each time it is referred to as Detroit, when actually this is Detroit and 54 communities that are now on the system with construction going forth for an additional 15 and negotiations under serious consideration for an additional 12. We are providing service now for better than 40 percent of the State's population, and it is increasing. And my discussion here is to hope to point out the merits of a metropolitan area operation as it pertains to the overall.

I should point out that in trying to satisfy your honorable conference here, that is only one of 253 autonomous units of government that we deal with. Saying that politely, that is too damn much government. But we, therefore, have difficulties in the acceptance of this type of program.

I raise that question because it seems to me that our plea here today is to get help from you people rather than establish that things aren't as good as they should be, which we heartily agree with. But there aren't many things you could do that would help expedite these programs.

I will briefly go over the report, and then I will refer to some of the factors that I think need to be emphasized.

In 1966, as a matter of part of your record already existing, the city of Detroit underwrote an area program and signed a formal contract with the Water Resources Commission of the State of Michigan whereby they agreed to do the area job. The map which went with that is on the wall. The contract is in here. The stipulations are part of this report. It is a part of your record at past meetings, anybody who wants a report, drop us a note, we will send them a copy.

In there, we say how the contracts will be prepared, how the rates will be set and how the relationships will be developed. Obviously, we are in a kind of a no-man or no-law area because development in the suburbs does not take place until you have water supply and potential for pollution control. And until that happens, you have no basic government with much of any financial capability to do the job themselves.

Obviously, the area job as the correct answer has been recognized by 15 different studies made -- Federal, State and local. And we know of none other than one or two engineering reports where the consultants said to do it locally. Of course, they did the design for the local construction.

I think that just briefly following the various paragraphs in the report, we did not get a clearance on the State grant account to execute this program until the first part of December 1969. In that month, we allocated $74 million worth of construction. Designs had been prepared over the years past awaiting operation. We are prepared to put $90 million worth of construction under way this year.

The pictures that you find in the exhibits are the ones that are existent. And if you people had time, I would like to have you go out to our sewage treatment plant and show you the 27 acres, 301 families that we moved, the heavy construction that is going on there and that for the first time, we are now doing what has to be done. We are doing the construction rather than the conference.

We have brief statements in here relative to where we are or what we are about to do with each of the packers.

As was mentioned -- I don't know which one of the Federal people mentioned it -- relative to the phosphate removal, we think we have that under control. We have met that which we said we would do.

I would like to point out one correction. There was some reference to 650 million gallons of sewage. Today we are treating in excess of 750 million.

G. J. Remus

On the bacteria coliform situation relative to the Detroit River, we did agree to 1,000 value as far as our sewage plant effluent is concerned. We have attained 1,000 as far as the Detroit River is concerned. There is no misunderstanding about that. But charts clearly show that if you take a median value of the Detroit River before you include the Rouge River flow that we do meet the 1,000 median value. And we will have 1,000 in our sewage plant effluent count as soon as our activated slip section of the plant is in operation.

As you know, we placed in service within a year's time a pilot station that was of a size equivalent to a community of 2,700 people. And some of the things that we are doing, we have documented pretty well. And we are quite sure of the results we will get.

We are using part of our plant improvement as far as biological treatment is concerned. We have decided to use oxygen for a variety of reasons for a portion of it. And hopefully, if it works out as successfully as we think it will, it will be used for all.

The reason for that is, of course, it takes less space, less initial capital investment. And after we get our own plant as far as oxygen compression is concerned, we would be getting less operating cost.

G. J. Remus

We have about $60 million committed, $40 million, roughly, is under construction, for an interceptor on the Clinton Valley. We would like to point out that is the area up here in Macomb County and Oakland County, the yellow area.

The red is the area Detroit will prepare and have under contract.

This section of blue will be awarded within the next month.

The red up in Oakland County is being prepared by Oakland County and is under construction.

While I am on this, I would like to just briefly point to one of the comments that was made relative to Selfridge Field. When Detroit's facilities are available, all they have to do is sign a contract, and it might be available. But I would like to point out that we have formerly contracted with Macomb County to build up to Mount Clemens. Selfridge Field is over here 5 or 6 miles away. I think this illustrates the typical situation we run into. Let Detroit do it. We will use them as an alibi. And that is what has gone on up here.

While I am on it, I would like to talk about Mount Clemens. Mount Clemens was included in the ban that existed in lower Macomb County several years ago. And it was lifted when we signed a contract with Macomb County.

Now, in this interceptor construction, we agreed to provide service for Mount Clemens. Mount Clemens has agreed they would have an engineering study made which they did. And about 2 weeks ago, their study came in and said, "You should join the Detroit system." Within the week, they had hired another set of engineers. And within that same week, we already knew the conclusion was going to be the opposite.

Now, it is those type of things that we think there has to be pressure put on to either do it or not do it. But I don't think that we should be committing $169 or $159 million worth of construction and then be badgered with that type of stuff.

I would like to point out while we are in this same area that we are building through the city of Warren a 12-foot sewer. That sewer is big enough to take care of Warren's requirements as per our contract with Macomb County. We are going to holler from here to kingdom come if they should suddenly get a grant because we are building that property through there at their request. And we did it when they had a building ban. And we corrected it afterwards.

I would like to point out, and I will refer to that later, that Warren has now challenged the State and

Federal Government on their grant program. And if they should win, I would point out that that is probably the last intercept that the central system will build. Because if we cannot depend on our revenues, we cannot build for the future.

This interceptor situation, of course, is paid for entirely by the revenues we expected to collect and by the revenue bonds we issued for our portion of the construction.

I would like to refer to a part of this problem which is not in our stipulations. But by the very nature of the fact that we commit our money to where we get the best results, we have gotten deeply involved with the stormflow as it is now. I will use one example. On May 25 this year, we had an average rainfall of .47 of an inch over the city of Detroit that lasted for 45 minutes. And the intensity was as much as .95 of an inch. All of that was treated. If it had not been, there would have been a large tonnage going to BOD and solids going to the Detroit River.

In doing this, it cost us considerable extra money in our operations because we pump our system which is made up of several 16-foot tunnels, two 12 by 17 foot channels. And we keep it empty, particularly just prior to a storm. And we have just recently put in operation a monitoring and telemetering system data logger which the Federal Government helped pay for -- roughly 50-50 -- wherein we have 138 sensor units throughout the city that give us sewer levels, storm intensity, the rapidity with which it goes across the city. And we think for the first time that we are beginning to make some real progress with this stormflow.

I mention this because I don't see how we can put in an activated sludge plant with all the construction at the sewage plant without also going at this stormflow system. We expect to expand that to the area. And in that way, we will be able to know when a storm comes in from Toledo to Lansing and Flint and Ontario and the whole area.

There is a part of our operations that, again, is not reflected in the stipulations. And that is what we call pollution prevention. Mr. Kallin of Ford Motor Company only talks about those things that they are under the gun on. He forgot to mention that we are taking a good slice of his problem up in Sterling Township and taking care of it for him as we are for General Motors, as we are for Chrysler.

Of particular importance is the fact that in the area that we serve, the Clinton River down to the Rouge River, there is no industry in the white or yellow area that discharges into the Detroit River or into the receiving waters. All their waste goes through the public system. We do the job for them to the extent that our system can handle their wastes. We have the proper ordinances, and we have about 6 men working on it all the time, to work cooperatively with industry to get our system in such a shape that we can handle our wastes. And if we can't, they have to put them in a preparatory position so they can be handled.

Some of the principal ones, one that isn't mentioned in the report, is Scott Paper Company. And, of course, that isn't under the gun right now. But that plant was right across from our sewage plant. On the basis of the orders given it, it would have had to shut down if we hadn't worked out a program with them because they had no space to build facilities. They are paying us today on the basis of the extra wastes we treat for them a little better than $580 a day. And it was with the cooperative effort with them because they felt it was important.

There are plenty of examples of what I think has to have a great deal of pressure. And that is pollution prevention, partly to control what comes into our system, partly -- somebody referred to salt. Last year, there were 406 million pounds of salt in the metropolitan area dumped on the streets.

Now, I hear some conversation it doesn't do any harm. Are we going to wait until the mess is here and then clean it up? If we are going to do that, people that are in our type of job will be forever under the lash of somebody. Because if we are going to wait until these messes are created, then you are never going to clean them up.

We have the same comments on other heavy metal wastes, on detergents. We think that a better job could be done there. Our common counsel has adopted a ruling to ask the State to adopt the law asking that not more than 10 percent phosphate be allowed on the market.

Now, if you are referring to page 8, you will see what construction would be done by the $90 million that I have referred to. I would like, however, to talk a little bit about the money, the financing.

On the basic $80 million that we have, we ordered $74 million of contract. But on the basis of the $80 million that was scheduled -- and the last part of it will be awarded this month -- the Federal Government should have provided $44 million. The State should have provided $20 million. And we should have provided $20 million. That is on the basis of the law that is on the land.

Since the Federal appropriations were not financed, it developed that our system provided $40 million and that the State provided $40 million and the Federal people provided $4 million. The State prefinanced $20 million for the Federal people, and our operations prefinanced $20 million for the Federal people. If you were in my place, you would make as nasty a remark as you could about this. And I am going to do the best I can.

It makes you so damn mad that of the $24 million that we had to issue bonds on this last week, we paid 7.78 percent interest, far more than we ever paid before. And $20 million of that was financing what the Federal people have committed us to. And if that is going to continue, you have broken the back of this type of an operation because we do not have the tax base or the metropolitan area available to us. We have only revenue bond financing.

In fact, the Federal portion of the grants we have received are like pulling backwards when you are going forwards because they haven't even kept up with inflationary factors.

Further, the State has to continue to prefinance a portion of the Federal. It's obvious their program will break down because $335 million for 25 percent of the job wasn't enough. And if it has to now go to 50 percent of the job, obviously the whole program is in jeopardy.

G. J. Remus

I have briefly commented on the fact that we have reduced our B. coli, that we have reduced our oils, we have reduced and have under good control bacterial kill. But we have in addition to that a considerable effort to exercise as far as BOD and solid removal is concerned.

I have also pointed out, and I as a representative of our department, and I as representative of the area, that part of this program that was late was because of the Detroit metropolitan efforts. We could not get clearances on financing. And the delays that we are now faced with are entirely because of that. And our stipulations, even though some of the charts in the report do not show it exactly, will be met in 1972 if you will give us credit for the extra BOD and solid loadings that we take on because of our improved method of handling stormflows.

Now, before I answer questions, I would like to comment on a few things. There has been a lot of discussion about the 180-day situation. Well, if the purpose is to help us, that will not be applied for this reason that we already have a lawsuit by the city of Warren. Add that to it, and you probably are putting us in a position where our bond financing people will say, "Hey, wait until everything is cleared up before you issue bonds."

If we don't say it, the investors will say it because they will say, "That is a kind of a flimsy operation out there, and we are not going to loan money to them." And that is particularly serious in this type of operation.

I would like to say also that -- Well, to finish that sentence, the Mayor of Detroit, the City Clerk who represents the Common Council, the City Comptroller, have to sign a stipulation saying that there is no lawsuit or potential lawsuit before we can issue bonds. And if we have all kinds of Federal and questionable legal positions to contend with, we will not get those clearances.

Now, I would like to bring out another thing. That is the reason I referred earlier to the business that this is a metropolitan operation, the city of Detroit being responsible for the execution thereof. This program has now been approved by four mayors since 1957 when it was adopted. The Common Council has continually re-endorsed the program and approved the bonds and so forth. But most certainly, if the progress that we are making now gets the impression that it isn't good enough, you are hurting our support toward the solution of this program. If you apply 180 days and divide it up, give us about 10, give a few to the State and the rest to the Federal Government for the delay proportionate, we are not going to argue for it. Actually, it would delay or confuse our program a great deal.

And I would like to just briefly -- and I have a brief report here on a water supply thing or the contracts we have awarded -- to refer to this because I believe there has been very little said on two parts of this program that are necessary outside of the stipulations that must be qualified for before you can construct in a sewage effort. And one is water supply.

If you examine this effort here which shows our sister, the plant at Lake Huron, under operation, you look in the report and you will see there is about $80 million of contracts under way and another $60 or $70 million will be awarded this calendar year. If you are going to adopt an area program which the Federal people have and the States, if that is going to be expedited, you cannot make it work unless you first put water into those areas. This is a very important part of this issue.

Take the Clinton Valley, for instance. There is only about 160 gallons of flow in that stream per person as it now looks, to say nothing about the development of the future. And under those kind of conditions, unless you reinforce that, you have either got a basic decision to make that the Clinton River will be a sewer, or it will be a stream. But you have to have water supply go into all the areas that are served before you can take the water out.

A second part that seems to me must be dwelled on a great deal, the Clinton River is an example of it, but our department has been designated by the city of Detroit as the area agency for stormflow control. And I would like to refer to the Rouge River.

To take Ford out of the Rouge River or anyone else and allow the same thing to develop further up in the county is an exercise in frustration. And that is what is happening. There are no means available today to relieve the Ford. We are working on it. We have now the basic organization. But until you also have a basic program working whereby the streams will be protected where development yet has not taken place, you are just postponing or transferring your agony from one place to another.

And I think those two points need to be worked out simultaneously before you put an area pollution control program into action.

Now, I have covered a lot of points here, some of them rather rapidly. I basically summarize it by saying that we have now $74 million worth of construction under way. We invite you to come out and see that operation. We are proud of it. We have $90 million worth of work ready to award or mostly ready to award and are waiting for the O.K.s on the grants which, Mr. Purdy, I think we will get in July to start awarding those construction projects that are listed in our report. But the other supplemental work of water supply and stormflow rationalization has to be put into action also. And we are working on that.

Thank you.

MR. STEIN: Thank you, Mr. Remus, for a very excellent statement.

Gerry, I think as I am getting older, I am mellowing, but I am glad to see you are still holding out.

MR. REMUS: I want to commend you because I didn't hear anything about sophisticated wastes or exotic wastes or pristine clear in this conference, which seem to me is all I heard about 3 or 4 years ago. I don't know yet what pristine clear is.

MR. STEIN: There you are. You know, these are classical references, Gerry.

I always thought that Jefferson said it better about the government years ago when he said, "That government is best that governs least." But I figured I had to come here and listen to you improve on that when you said we have "...too damn much government."

Are there any comments?

MR. MAYO: I have several comments, Mr. Chairman.

First, I would like to thank Mr. Remus for providing us very recently with a very detailed breakdown on the construction program that has been requested from the Regional Office,and for appending or making a part of that breakdown essentially a schedule of compliance,or apparently a schedule of compliance with the stipulations. And we have got a few questions that we would like to ask about the apparent dates at which certain levels of wastewater treatment improvement could be accommodated. And I would like to just go through some of the specific stipulation items.

As we interpret the information you provided to us, Mr. Remus, the current stipulation calls for a BOD load in the discharge of 412,000 pounds per day if not more than that.

Or, rather, 250 pounds per day. Excuse me.

In reviewing the information that you provided to us, you would get down to approximately 262,000 pounds per day by August or September of 1973. If we interpret the dates that you have attached --

MR. REMUS: I think that was shown in the curves, yes.

MR. MAYO: As we understand the basic date for the current stipulation -- perhaps Mr. Purdy can correct or confirm this -- we are talking about November 1972. Is that correct?

MR. REMUS: That's correct. And I commented on that a little bit. And I would like to reemphasize it. As we start working this problem out, obviously some of the factors we agreed to in the contract for 1966 have taken a little different form. If you will take the construction that we have complete in 1972, which is contracts that will be awarded this calendar year, with what is already under construction and give us some credit for the job that we are not required to do by law on the loading as far as BOD and solids are concerned and the stormflow, we will be doing better in the sum total picture.

MR. MAYO: My query wasn't intended to be critical. I want to make sure that we are interpreting the information.

MR. REMUS: That's correct. I didn't take it that way. I think it is very important because of the fact of the definition of our job which is to get the best value for the dollar you can get ahold of. It required we had to take a crack at this and get what we call the first flush of the storm which isn't really a good definition, but which illustrates that we had to capture a lot of the dirt that lies in our combined sewer system if we weren't going to flood out our plant any time we had a storm.

MR. MAYO: Just to follow through with the identification items, the stipulation would provide for not more than 50 milligrams per liter or what would seem not more than 452,000 pounds per day of suspended solids.

MR. REMUS: Correct.

MR. MAYO: And you would reach that level approximately January 1975?

MR. REMUS: That's correct. And, again, I have to take credit for the opposite of this picture. I think if we take the total catalog and inventory what we are doing, we are taking the solids out. It is unfortunate that we did not look at it in the total picture when we signed this contract because that is only one arm of the total problem.

MR. MAYO: With respect to phenols, the stipulation provides for not to exceed 115 pounds per day. The information that you provided to us was in terms of percent of effluent. And I would appreciate it if you would make some translation for us between the percent of effluent if you can get that down into pounds per day at some place.

MR. REMUS: Well, originally, I think the contract I have here said 95 pounds per day. Now, on that, I am having considerable amount of trouble. And we do not figure that factor is realistic. We have talked some to the water research officials on that. To put ourselves in a way of analyzing it is to point out that the 93 pounds applied to

Detroit with 57 communities we have under contract with all their industry, all their commercial establishment and the Ford Motor plant in itself has got 70 pounds, I think there is some unrealistic figuring here. We had hoped that this would in a normal sequence of events take care of itself as this construction went forward.

To keep ourselves on a reasonable basis there, our agreement with the Ford Motor Company was if we could get it down to acceptable standards, we would accept their portion of their waste. If we couldn't, of course, they would have to provide for it themselves. And we are in that study area now.

We think we will approach it, but 93 pounds is a pretty unrealistic figure when you consider the type of load we have.

MR. MAYO: As I understand the later stipulation, at least the figure you provided us with was 115 pounds per day.

MR. REMUS: That probably took advantage of the Ford slice that they have turned over to us.

MR. HARLOW: I think, Gerry, there was 22 additional panels added to the 93 for the north interceptor.

MR. REMUS: I don't remember how that was arrived at. Raise it to about 300 pounds, and we have got it made.

What do you say?

(Laughter.)

MR. MAYO: Do you want to roll the dice a couple of times?

MR. STEIN: Well, I tell you, you are up to 7 what in your interest? What is your percent rate on your interest?

MR. REMUS: 7.78.

MR. STEIN: You are going to have a lot of lawsuits to scare me off buying those. But why don't you raise that bond figure? It looks real attractive.

MR. REMUS: Those are tax free, too. That should interest you.

MR. MAYO: Could you provide for us some information on what the pounds per day of phenol in the discharge are at the present time?

MR. REMUS: It is too high. It is somewhere in the range of about 1,200 pounds a day.

What were those figures you gave me this morning?

DR. SHANNON: This year, it was 1,700. The average this year was 1,700. Before, it was 1,500.

MR. REMUS: It is too high. It is 1,500 or 1,700.

MR. MAYO: As we would interpret the projection of information that you have given, you would get down to the range of the 70 percent reduction over the effluent until sometime about 1975.

MR. REMUS: Well, I don't think I am prepared to answer that. I would think, however, that we would have the proof to that in the next couple of months pretty directly or at least when the construction we have now under way is under way. The way we have resolved or are going to resolve the problem as far as we are concerned is that we can't get this down to acceptable poundage. When we get our 1972 construction complete and in operation, then we will go to the pollution prevention aspects of it, one being the Ford Motor Company, saying, "We can't handle your phenols." That will take one portion out of here.

We will go to the industries and to the people that we serve so that at the input side, we will start reducing that. But I do not see that we can justify millions of dollars just to put a phenol reduction plant in there. I think it has to be attacked at its source.

MR. MAYO: Do you feel it would be practical to take this approach of essentially pretreatment at the point of discharge from the industrial constrictors of phenol waste at a much earlier date than that? A lot of your basic program places that burden on the discharger rather than the metropolitan system.

MR. REMUS: We are doing that as I related. I think it is 488 industries we have met with to ask them for what they are putting in. Our monitoring system is being designed so we can keep checks on what is coming in. And I think that by attacking it at both points, we can get that down to a couple of hundred pounds where we ought to be, at least.

MR. MAYO: Do you have any time frame that you would suggest that might be accomplished?

MR. REMUS: Well, last month, wasn't the figure, Mr. Shannon, 1,200 pounds we had in February and March?

MR. SHANNON: Yes.

MR. REMUS: We have knocked some of it out already as we have on the oil by going to the source of the problem. We have not attacked the problem yet from a standpoint of the suburbs as energetically as we should, but will for the reason that our contracts provide control. But the ordinance does not define that precisely. But many of the suburbs, of course, are sending in, since we are wholesalers through our master meetings, wastes that we don't think they should be sending to us. So by attacking both within Detroit and the suburbs against discharge, I think we can meet that standard.

And I would think that gradually here in the next months, we will be bringing that down.

MR. MAYO: With respect to oil, the stipulation requires that there be not more than 15 milligrams per liter. Your projection would indicate that you would reach that level of treatment at about January 1975.

MR. REMUS: Unless we can do a better projection job. I think Mr. Balden of Chrysler gave you a little rundown in the development of his facility. I think that is a good illustration on the proper way to go at this in that when they were ready to build their plant addition, their improvement for treatment, they came to us. And we ran quite a few tests to establish which was best. And we took wastes from them that we could handle. It saved them quite a lot of money, and it improved our revenue picture.

So the 1975 data, I think if you add it to the credits that we should have because of other things, we have done well and really have obtained that goal sooner.

MR. MAYO: Is there much of an opportunity that you could pass the responsibility for oil removal back onto the original discharger as distinguished from the district assuming the responsibility?

MR. REMUS: There is no doubt that we can hand it back to the suburbs because we can check whether their waste comes into our system -- at least most of them. In Detroit that gets to be quite a hide-and-seek game.

I don't think I better say any more about that.

MR. MAYO: I think that is a problem that is characteristic of every one of the older metropolitan cities.

MR. PURDY: Mr. Chairman, I think an example of what is taking place in this area is the fact that Detroit had as a consultant to them the late Hayes Black and have instituted a sampling program on their sewer system. And as Mr. Remus pointed out earlier in his discussion, he has some 6 people that devote their full time to this particular activity. And I think it is not something that will ever cease. This will be a continuing activity that will have to go on from now as long as the Detroit Water Board operates a metropolitan system.

MR. REMUS: I am sure that is 100 percent true.

I would like to point out also that in the reductions we made on bacteria, on oils and on phosphates and even the BOD and solids loading having stayed where they are, is quite some accomplishment in light of the rapid expansion that has taken place in the Detroit metropolitan area. So this has all been accomplished, not as well as we would like, but it did not restrict development in any way.

MR. MAYO: With respect to the phosphate loading, the stipulation provides for 80 percent removal of soluble phosphate and not to exceed 26,000 pounds per day.

We note in extending your schedule here that you would get down below the 26,000 pounds per day in 1971, but that the 80 percent removal would not be achieved even by 1975 or 1976.

MR. REMUS: Well, the way our system operates, I don't know how you can use the term 80 percent. I think we would have to use the basis of what we discharge to the river. We have been as low as 7,000 pounds on ortho and 5,000, some days not any. And the reason for that is that we have accepted even sulfide wastes from a steel pickling industry in small amounts if they neutralize it first. We have allowed the steel industry to put their wastes in within our system. So that total phosphate that comes into our system is not really known because part of that reduction process takes place in the system. And we would rather that we use a figure of so many pounds that we would be allowed to discharge. And that way we don't have to do the wonderment about what is happening in our system.

To further emphasize that, when the steel mills went on strike and they dumped their vats, we had no phosphate at all. So I think it would be a very hard thing to use 80 percent factor there.

We have another factor that we refer to in our contract. We refer to ortho phosphate. And, of course, that is one of the improvements we think should be made in the contract. We have informally discussed this with the Water Resources Commission and found no objections to making that solid.

MR. PURDY: I think you stated to this conference, Mr. Remus, you are looking at total phosphates.

MR. REMUS: That's correct. We are looking at the total figure even though the total contract is still in the original form.

MR. MAYO: That was a point I wanted to raise with Mr. Purdy because what the conference recommends with regard to phosphate removal is in terms of total phosphate as distinguished from the terminology soluble phosphate that you have used in making your projection.

MR. REMUS: Well, of course, when we signed this contract in 1966, we had very little information as to what really was going to happen anywhere. I think that to clear the record and make the record secure, we are talking total phosphate in our program.

MR. MAYO: As far as Michigan is concerned.

MR. PURDY: There is no disagreement. Mr. Remus has made this commitment to the conferees several times. And we are in agreement with it. This is what we are looking at. There is no disagreement on it.

MR. STEIN: Are there any more questions or comments?

MR. LYON: Mr. Remus, do you have any idea how many treatment plants other than your own exist in that area on the map there?

MR. REMUS: There were quite a few little ones. In your report there, it shows a small section of this map, and you will see a bunch of little plants identified on there that were eliminated or are in the process of being eliminated.

MR. LYON: So there are really very few left now?

MR. REMUS: That is correct. The only two that are in discussion in this whole Macomb area are the city of Warren who have challenged a grant program and the city of Mount Clemens who saved money by running from one engineering consultant to another.

I hope somebody from Mount Clemens is here. I wouldn't want that to be wasted.

MR. LYON: The reason I asked this question, Mr. Chairman, is because I think Mr. Remus and his organization and municipalities and industries in this area should really get a huge amount of credit and congratulations for the outstanding job that they have done in developing this kind of system in the Detroit area. It is something that is going to save the industries and the municipalities and taxpayers in this area large amounts of money, including Federal grants and State grants and so forth.

I wish I could say that we had similar systems in Pennsylvania. We recently made a study in the area on Pittsburgh and North Pittsburgh in a 50-mile radius of Butler, Pennsylvania. We found, believe it or not, 950 sewage treatment plants, industrial waste treatment plants, and drainage treatment plants. And as you can imagine, the diseconomies, the costs, in that kind of fragmentation are almost incredible. And it really shows a very fine accomplishment that has been attained here both in saving tax dollars for the citizens and helping to clean up Lake Erie.

MR. STEIN: Well, we have that prefinancing problem. And as you know, I have tried in previous conferences and in public statements for the Federal Government to give Mr. Remus credit, but he always answers he wants cash.

(Laughter.)

MR. REMUS: I would like to keep before you the overall program. And that is, if the Clinton Valley cleanup, which is a tributary to Lake St. Clair and the Detroit River, can be held together with the type of construction we are doing and systematically, the Rouge and the Huron will come under the same type of improvement. If we try to do it all in one big glob, it will break because there won't be that kind of money available. But there is a systematic way of doing it.

We did it with water supply when we laid that program out. We presented a program of $172 million. And pretty near everybody fainted. And if everybody had approved it right away, I would have fainted. But the fact remains that it was approved. We did construct systematically.

We expected $172 million worth of construction to carry us to 1985. As a matter of fact, it only took us to 1966 from 1959. And we were able by that process to develop enough revenue base so that since that time we have spent at least another $175 million.

The same thing can happen here if we do it in an orderly way for the entire area.

MR. MAYO: In Mr. Purdy's summary with respect to the Detroit system and in your summary of construction information, you both used the terminology "advanced treatment."

MR. REMUS: I would like to answer that because I am having fits about this business of what concentrated activated sludge is -- I didn't mean it that way, but that is how it came out -- or secondary treatment or tertiary treatment. Our treatment is made up of oxygenation and the use of chemical treatment to the extent that it is necessary in combination to take care of both the organic and inorganic waste. And I call it "advanced treatment." And I don't have to get all hooked up trying to explain in front of various groups what so and so meant and what so and so meant.

MR. STEIN: Let me make a comment on that because I think it may save time all around. I think maybe you don't like this term that I used before, possibly -- "sophisticated." But I think as our treatment is getting more and more sophisticated and we are dealing with the things you are talking about here, the sooner we stop using the terms "primary," "secondary," "tertiary," "advanced treatment," and the more we describe these in the terms which you have attempted to describe them -- the things you tried to get out, the pounds per day you are trying to remove, or if you can't do it in pounds per day, possibly percentages, but hopefully pounds -- I think we are going to be a lot better off. Because I have found that even in terms such as "secondary treatment," it may mean something. As you take such a term as "BOD," it can vary from 75 to 90 or 95 percent. And that is quite a spread. You are not talking about the same thing.

I do think, Mr. Remus, the kind of approach you have taken on these specifics -- and, by the way, we have gotten this from the industrial people representing Chrysler and Ford on meaningful terms today, and that is generalized terms.

MR. REMUS: I agree with that 100 percent because there is so much confusion existent today about what we are talking about. They say, "98 percent treatment." Well, you can spend a week explaining that.

MR. STEIN: That's right.

MR. MAYO: It is our understanding, Mr. Remus, that the current stipulation under which you are operating has a completion date of the fall of 1970.

MR. REMUS: Right.

MR. MAYO: And that you presently have before the Commission a request for an extension of that date or a subsequent stipulation. Is there any range of dates specifically being discussed?

MR. REMUS: If I had to do it over again, I would never have sent that in because of this factor that all we can do is as rapidly as we can get money do the construction. We lost in awaiting financing and in clearing red tape better than a year. We do not think that should be charged to us. You add that to the November 1970 date, and we are not very far out of step.

These contracts that we have referred to, and we are not talking about plans or what we are going to do, this was sufficient. That is, this action will be completed in 1972, and I think you will see great improvement.

MR. PURDY: I would like to comment on that. Mr. Mayo, that request was placed before our Commission, and the Commission recognized that any extension of time would have to be a joint Federal decision and also a joint Federal-Lake Erie conference decision. The Commission did not act upon it. It instructed me to discuss this with the Federal Water Quality Administration officials. And at their request, the Commission has delayed any action upon that extension of time pending progress by the city of Detroit. And that is where it lies at the moment.

MR. REMUS: I would want to emphasize that since we have had clearances on the funds, I think the record shows very clearly that a great many millions of dollars of construction are under way. And as soon as we get the next clearance, another $90 million will be put into construction. And it will be what it will be and where. It is not satistory to us, and it probably isn't to you people. But nevertheless, the basic construction program is under way.

When did we start?

You know, I can't remember, and I have been here 41 years. But in World War II, if you said something when the Federal Government came in and stopped automobile production and started the airplane production about getting that out of the sewers, you would have been unpatriotic. And that's really where the great amount of this deterioration from the standpoint of keeping up with the job occurred.

MR. MAYO: I have one final question, Mr. Remus. In your schedule, you indicate that as of November 1972, approximately 400 MGD would be received in primary only and the remaining 400 MGD would be received as you have identified as "advanced."

MR. REMUS: That has been stepped up in that we are referring to twice the capacity for half the amount on oxygenation because you can get more out of there. So about two-thirds of the total output would be aerated; all of it would be treated with polymers and chemical precipitation. And I think we will meet those standards that are on the basis of data we have prepared.

MR. MAYO: You have indicated that all of the approximate thousand MGD will receive what you have identified as advanced treatment by 1976.

MR. REMUS: That's correct. And if you will refer to the program we referred to, that additional $280 million worth of construction, that's what we are talking about. That is not financed, however. The $159 million is. And here I think the Federal people can help us a great deal because by that time they will owe us $40 million on the basis of the schedule we have got. If we get that plus a few other things, we will do the $280 million, too.

MR. MAYO: Thank you very much.

MR. STEIN: Any other comments or questions?

(No response.)

I admire your financing, and I am not going to dispute it here about owing you $40 million. I will try to get you as much as I can.

You know, I would like to join Mr. Lyon in saying that I think that you certainly ought to be commended for working out as effective a plan with your suburban communities as any I have known in the country, particularly when you have had to go the hard way through negotiations.

MR. REMUS: Thank you.

MR. STEIN: In some of the places they put them all together by State statute, and there is no way to go but you have had to do it the hard way. And I think this is a problem we have all over. And I think in my opinion, there is no question that you have been more successful here than we have anywhere else in dealing with that kind of problem.

Are there any other comments?

(No response.)

Let me just tell you a little bit because I know you get confused or everyone gets confused on this financing and Federal operation. But because we have had to consider the city of Warren suing us as well as you, maybe they think we are on the same side. I don't know. It is very peculiar.

I don't know if a representative of the city of Warren is here to hear this. I don't want it to be lost. After they finally sued, they came into Washington and asked for it again.

And I know at least the way I have been brought up, and I think you have been, Gerry, when someone sues you and they come around and ask for money, I don't know that the welcome mat is out. I don't quite understand that.

I was going to say a little before we stopped this on financing to give you an idea how this works. I was out with three fellows the other day for lunch in Washington. And after the check came, all these three people grabbed. I was sitting there quietly. But they all grabbed for the check. And each one had their hand over it. And one fellow said, "You better let me pick this check up." He said, "You know, I am in the 50 percent tax bracket. It is going to cost me 50 cents on the dollar."

The other fellow said, "Heck, I am in the 90 percent bracket. It is only going to cost me a dime." The third fellow said, "You both better quit and give it to me. I have a contract with the Government, and I am going to make 6 percent."

Thank you, Gerry.

MR. REMUS: No wonder you didn't reach for that check.

MR. STEIN: I was in good company.

Thank you, Gerry.

MR. PURDY: Well, Mr. Stein, we, of course, are quite pleased and very proud of the accomplishments that have been made in pollution control here in southeastern Michigan through the regional system. Significant progress has been made. There are places where there have been significant delays, but you can see a program unfolding.

Yesterday, in the Government's presentation, if you remember, he came out strong for the regional systems. And in his remarks, he did note that in dealing with these many units of government in a regional system that this required time and that there might be delays in unfolding the system, delays that we would not like to see occur, but in the long run if we gave time for the regional system to develop that we would come out ahead in the future. And so this is the sort of program I think we see developing here in the southeast Michigan area.

I have one other request to make a statement. I have been informed it is a short statement. It is Mr. Liebert, representative of the Downriver Antipollution League.

Mr. Liebert.

STATEMENT OF HILLEL S. LIEBERT
DOWNRIVER ANTIPOLLUTION LEAGUE
ANN ARBOR, MICHIGAN

MR. LIEBERT: Thank you, gentlemen, for letting me make my statement without any advance warning. I walked in and asked to be able to do this, and lo and behold! I was the next speaker.

My name is Hillel Liebert. I am a social worker student in community practice at the University of Michigan. I have lived in southwest Detroit, and I have been asked by the Downriver Antipollution League to make a few comments, a few statements, which mainly deal with process. They don't deal with the technical points, and they don't deal with much of the substance I am sure you have been talking about.

I wasn't here yesterday. I am not sure exactly what has gone on. I know mercury is a big issue here, and it is with us. The Downriver Antipollution League is made up mostly of working people in the downriver cities. Southwest Detroit is included, but River Rouge, Ecorse, Wyandotte, Lincoln Park, and all the way down to Monroe is where our members live.

They couldn't be here today because many of them are working. We have heavy representation among UAW workers, steel workers, and oil, chemical and atomic workers in that area.

Mainly, the statements deal with citizen participation. And I jotted down a few notes. We will see how brief I can be.

First of all, we feel citizen participation is very important. Back at school where social workers talk to social workers, we have heard a great deal about the new trend. Citizen participation is in. It is the thing. But when I come to hearings of the various enforcement officials, bodies, when I see the newspaper headlines, when we speak with officials and write to them and receive replies, we find this is not really as in as we would like it to be. And we find that citizens do not have as much influence as we thought or that people in the campuses perhaps think they have right now.

We feel that citizens can best represent citizens. And we feel that there is need to make some changes in the procedures and processes that people in the pollution field are setting up and following right now.

We feel also that citizens can help. We feel we can help officials on all levels. In particular, the people in the downriver area say that they have a very special position. They work in the plants. They have a lot of information. And they have been offering this information, but it hasn't been taken up. Their offers have not been taken up. And they want you to know that they are willing to cooperate and to help in cleaning up the environment in every possible way.

I think it is important, especially in these times of unrest, that citizens are involved on all levels before crises emerge and they start picketing as well as after crises like the mercury one emerge. In these times, I think it is important that citizens have not only a feeling that they have some control over the environmental forces around them and that are affecting their daily lives, but that they actually have a significant degree of control over these forces.

We feel that the commissions, including the Water Resources Commission of the State of Michigan, need widening. And one reason we are interested in this particular hearing is that we feel Federal intervention may be necessary because we don't seem to be able to get anywhere when we ask for citizen participation on the top levels; citizen representation on commissions such as the Water Resources Commission. And we find when we read back, John Kenneth Galbraith wrote about counterbalancing power where the giant labor unions on the one hand and giant business corporations on the other hand will counterbalance each other and the public interest will somehow be served. We find when we read about this and we talk about this that it is not true in the water pollution field. There are no labor representatives on the Water Resources Commission to represent the so-called powerful labor interests and to counterbalance the interests of the big business corporations in this State.

This is the main concern of the Downriver Anti-pollution League right now. This is what they asked me to say.

On two particular issues, we feel we have been getting a run-around. One of them is the mercury issue, of course. I am not going to say too much about that. We had a district engineer from the Water Resources Commission toward the end of March speaking at a public meeting of ours. He was extremely defensive about questions dealing with Wyandotte Chemical Company and mercury pollution.

He was even more defensive when we brought up the question of thermal pollution which might result from the Detroit Edison nuclear plant -- I think it is called the Enrico Fermi plant -- in Monroe where many of our members are very upset by the fact that they don't seem to be installing cooling towers or concerned too much about possible damage to the environment, and they are operating.

We feel people aren't listening to us. We feel we have interests to represent, and we have a contribution to make. These two issues in particular are up right now for discussion, and we hope that citizens will be involved.

It is true there are procedures like this. I am allowed to get up here and speak. But we find that the general structure, not only of the commissions, but of hearings and procedures and setting of standards make it very difficult for citizen groups to be involved and make their feelings known. Just the general attitude of officials, the way the people are spoken to and dealt with, makes it very difficult for us to say what is on our minds.

We also feel that although the enforcement officials do have problems in the areas of funds, funding and enabling legislation, that they seem to be overly concerned with business interests, interests involved in tourism, and less concerned with the citizens who live and use recreation facilities in the areas affected or involved.

We feel we need strong penalties, and we need strong enforcement of those weak penalties we now have if we are going to get anywhere. And we feel that small people and people in the middle areas such as the commercial fisherment in Lake St. Clair need compensation for losses caused by such companies as Dow of Canada -- the future losses perhaps from other companies on this side in the mercury area. And we feel we are not going to get any action unless there is Federal intervention. At least, at this time, this is how we feel.

Federal standards are extremely important. And Federal pressure on State officials is what we think will really count.

And thank you very much for letting me just say this. This is our feeling right now and our attitude. And that is about all they wanted me to convey.

MR. STEIN: Thank you, Mr. Liebert.

Mr. Purdy.

MR. PURDY: Mr. Liebert, I think that you do know that there is a 7-member Water Resources Commission. Three of those members are citizen members at the present time appointed by the Governor. That's not quite 50 percent, but there is citizen participation in the Commission.

The Commission does not determine who the members will be. This is a legislative matter.

The Commission has not opposed widening of representation on the Commission. To my knowledge, there has never been a bill introduced in the legislature to place a representative of labor unions on the Commission. I would imagine that if such a bill were introduced that the Commission would support this sort of widening of representation.

So I believe that your criticism of the Commission from that standpoint is somewhat unfair.

MR. LIEBERT: Thank you, Mr. Purdy, for your support in our request or what I think is your support. There is a bill, or I have been told there is a bill, which asks additional representation on the Commission from the Department of Commerce.

MR. PURDY: That's correct.

MR. LIEBERT: And we would hope that the legislators we have been speaking with, if this bill hasn't already been disposed of, and the Water Resources Commission would ask that this bill be amended to specify conservation interests to be represented and labor interests as well.

MR. PURDY: Generally, a good way to kill legislation is for the administrative agency to ask that something be included in it. The legislators seem much more responsive to the citizens rather than the administrative agencies who are frequently referred to as bureaucrats that are only trying to widen their scope of power. So I say to you that you ought to contact your legislators and get them to introduce that amendment. And you will be much more successful in doing that than having the Water Resources Commission attempt to do that.

MR. LIEBERT: Yes, sir, I think our members have been trying to do this. And I think you are right.

One of the problems we had, though, or we felt that exists, is the fact that when you have all these department heads on the Commission, it is hard to get action. There are conflicts of interest, and there are vested interests. And we would prefer to see them as consultants rather than as voting, active members of this Commission.

But I know this isn't really the business of this body.

MR. STEIN: Yes, I am not sure you are making your pitch before the proper forum. I don't know whether we agree or disagree with you.

Thank you very much.

MR. PURDY: That completes the presentation on the part of Michigan. I would like to make one closing comment on Michigan's behalf.

Yesterday, you referred to the problems of pollution in Lake Erie. We had a presentation by the Bureau of Commercial Fisheries in which certain recommendations were made. And they said that the solution to the problems of Lake Erie was the removal of nutrients and under questioning specifically stated phosphates to be the key. Other problems that have been identified in the Detroit River and Lake Erie are problems caused by bacteria of human origin as it relates to the coliform organism as the identifying form, although Lake Erie as a whole does not have a bacterial contamination problem.

Other problems have been suspended solids of municipal and industrial waste origin -- phenols primarily of industrial origin, oils of industrial origin, waste acid from steel mills, and then the organic oxygen-consuming substances as measured by the biochemical oxygen demand, largely traceable to paper mills and municipal waste sources.

Now, I think really that major progress has been made in the battle to save Lake Erie, in particular since the problem in Lake Erie as a whole relates to the nutrient input and in particular phosphates. We pointed out that the Detroit Water Board system that serves some 40 percent of the population of Michigan represents the largest single input.

Also, now, it has provided treatment to take the phosphate nutrients, tie them up so that they are not available now to feed the algae loads in Lake Erie.

Significant progress has been made in controlling the bacteria of human origin. The suspended solids load from industry has been largely now reduced to the objectives that the Water Resources Commission has set. And those objectives had been agreed to by the conferees.

The polyelectrolytes will be added to the Detroit water for the system in 1971, and there will be significant reduction of suspended solids of municipal waste origin.

The phenol problem is yet to be licked entirely.

The oil problem, though, has been substantially corrected. This was largely of industrial origin.

The waste acid from steel mills now has been completely eliminated. As a waste, it has been fed on a control basis in the Detroit system to control nutrients.

So I am not quite as discouraged as some of your remarks might have indicated yesterday. I think that major progress has been made towards saving Lake Erie. There are remaining problems of major concern, but these problems now affect largely localized areas within the Detroit River and the localized area near the mouth of the Raisin River.

There are some dissolved oxygen problems there right at the mouth of the river, and there are the coliform problems on the Sterling State Park beaches. But again, construction is under way to correct those problems, and we can see an end. So I am encouraged by the progress that has been made.

MR. STEIN: Thank you.

Are there any comments or questions?

(No response.)

If not, does Michigan have any more?

MR. PURDY: That's all.

MR. STEIN: I think we will be able to complete the presentations of the other States before the noon break. And this afternoon, we will devote to mercury.

At this point, we would like to call on Ohio.

STATEMENT OF GEORGE H. EAGLE
CHIEF ENGINEER
OHIO DEPARTMENT OF HEALTH

MR. EAGLE: Mr. Chairman, conferees, ladies and gentlemen, my name is George H. Eagle. I am Chief Engineer of the Ohio Department of Health. The Division of Engineering serves as the technical staff of the Ohio Water Pollution Control Board. On behalf of the Board and the Department,

G. H. Eagle

I wish to submit this report in its entirety for the record.

I am going to skim through this report to some extent.

With regard to municipal programs, the conferees established corrective measures and schedules of construction for 95 municipalities involving 97 projects, 77 of these municipalities were to have the required facilities completed by December 31, 1969. The progress to date with respect to these requirements is as follows:

This is basically the same data Mr. Harlow presented yesterday, but the summaries are quite different. And you will note here that of these 77 municipalities, only 35 had completed and placed into operation their facilities. Another 33 of them are in the construction or planning stage at this time, and there are nine that I will report on separately. But of these 33, in the next paragraph, explanation is given of what the status of these are, the progress that they are making.

And of the remaining nine, three of these nine communities have failed to make satisfactory progress in the planning of the required facilities. These communities -- namely, Avon, Independence and Oakwood -- have been ordered after public hearings by the Board to submit reports and general plans by September 1970. To prevent further water pollution from these communities, the Board has prohibited any new connections to the sewer systems of these communities which contribute additional pollution to waters of the State. In essence this means a freeze on any new building in these communities. Three more communities, namely, Grand River, Northwood, and Waterville, are required to complete the necessary legislation and to provide the necessary sewers for conveying their municipal wastes to the facilities of another municipality. Two communities are preparing revised plans for facilities to accommodate expanded service areas. The ninth community finally hired an engineer in February of this year.

The schedules adopted by the conferees called for the completion of 15 more municipal projects by December 15, 1970. Five of these are currently under construction, two will be completed this year and the other three will be completed during 1971. Detail plans have been approved for the sixth municipality with construction to begin this fall. A seventh is preparing detail plans. Of the remaining eight municipalities, six have failed to make satisfactory progress in planning the necessary facilities. As a result three have been ordered by the Board to prepare the required detail plans prior to January 1, 1971. These three are Broadview Heights, Euclid and Willoughby, all in the Cleveland area.

In addition, Painesville and Amherst have been ordered to complete detail plans and general plans respectively by September 1970 and Fairport Harbor has been ordered to complete negotiations for connection to the Painesville systems. The Board here again has imposed a "freeze" on any new building in Painesville, Fairport Harbor and Broadview Heights. Of the remaining two, the City of Sandusky is required by current permit to initiate construction, and the City of Delphos is required by permit to authorize the preparation of detail plans by June 1970.

The facilities under construction by the City of Akron are one of the two projects mentioned above to be completed this year. In fact, these facilities should be completed by July 1. Concurrently with the completion of this project three of the four major rubber companies will complete this fall major pretreatment facilities for the significant reduction of latexes discharged to the Akron city sanitary sewer system. A fourth company is expected to complete its latex removal facilities next spring. Also by next spring, facilities for the recovery of spent pickle liquors from a major operation now discharged to the sanitary sewer system will be placed in operation.

These have been quite a problem in the City of Akron as pointed out here. And these pretreatment facilities are being installed in accordance with the City of Akron and Ohio Department of Health requirements. And the general clean-up of the other industrial waste problems in the City of Akron, and in view of the above, these major improvements of the system in Akron should considerably improve the water quality of the Cuyahoga River downstream from Akron this summer. This has been a very, very difficult problem.

The schedule adopted by the conferees for the completion of projects beyond 1970 are as follows. Cleveland-Westerly December 1971, Lake County-Madison Sewer District January 1, 1971, Lake County-Willoughby-Mentor Sewer District January 1, 1971, and Toledo February 1972.

Toledo is under construction, and these others are in the various stages of planning. And the Board has ordered the City of Cleveland to submit detailed plans of improvements to the westerly plant by November 1970. This order was given because the City of Cleveland failed to comply with earlier permit conditions calling for general and detail plans acceptable to the Division of Engineering. The orders of the Board were supplemented by a ban on additional pollution of waters of the State by the city, here again, by the building freeze type of order in the City of Cleveland.

And the details of all of this are given in Table 1, Appendix A.

G. H. Eagle

With regard to phosphorus removal, remember, at the last session, we gave a rather detailed report on the facilities that were being ordered and planned in Ohio for phosphorus removal. And our policy was adopted by the Department to require all plants to design capacity of one million gallons per day or more to provide phosphate removal facilities.

Major facilities now under construction and in a few instances nearing completion which will provide phosphorus removal include those of Ashtabula, Avon Lake, Cleveland-Easterly, Lorain, Port Clinton, Toledo, Akron, Defiance and Findlay. The last three discharge to tributary streams whereas the first six discharge directly to the lake. The combined phosphorus load to these facilities is estimated to be 16,600 pounds per day or nearly half of the total estimated Ohio municipal load to Lake Erie. Phosphorus removal facilities at the Cleveland-Westerly plant have been in operation for a number of months with temporary facilities on an experimental basis.

Later this year major phosphorus removal facilities are expected to be placed under construction at Rocky River.

With regard to the industrial programs, completion schedules for facilities for the abatement of water pollution by discharges of industrial wastes to the waters of the State were adopted by the conferees for 97 Ohio establishments. In no instance did these dates extend beyond December 31, 1969, that is, for completion. Sixty of the required projects have been completed, four other industries have ceased operations. Fifteen others have facilities under construction; 13 of these are expected to be completed this year. Eleven others are expecting to connect to municipal sanitary sewers in their areas. Plans of proposed facilities for five industries have been prepared and are awaiting approval. One other industry is planning to cease all operations this fall. Studies are underway at one plant which has built substantial in-plant facilities for the recovery of process chemicals.

One of the proposals for the discharge of industrial wastes to municipal sewers is rather unique and may be of interest to the conferees. The City of Cleveland is planning to accept the calcium sulfate wastes from the Harshaw Chemical Company into its sewer system for conveyance to the Southerly plant. This waste is expected to aid substantially in the city's proposal for removal of phosphorus of this plant.

Water quality standards -- suffice it to say here that Ohio has revised water quality standards criteria which were adopted on April 14, 1970, and were worked out with the

Federal people and have been submitted to the Secretary for approval. These are appended in Appendix B of this report. And these criteria include the statement on the protection of high quality of waters.

And I might point out that these criteria apply to Lake Erie or portions thereof where such quality levels are better than existing water quality. In the Lake Erie water quality standard, we stated where they were not better than the existing quality, the existing quality in the lake would prevail, would become the standard.

Now, with regard to advanced municipal waste treatment or 95 percent removal if you prefer or whatever you want to call it, we have a number of places in Ohio that call for more than the conventional secondary treatment. And these are listed here. There are about 10 municipalities that now are presently in one stage or another providing so-called advanced waste treatment facilities.

Now, on the next page, we speak about the excessive stormwater problems in combined sewer overflows. And these are very serious problems in and around the City of Cleveland. And failure of the City of Cleveland was one of the reasons that they were given an order to prohibit any further contacts until this program moved forward.

Another serious problem is the use of storm sewers of the City of Euclid which conveyed industrial wastes to Lake Erie. Legally, the use of this sewer -- I think Mr. Harlow mentioned this in his report yesterday -- is under the jurisdiction of the city, of course. Action towards correction of pollution caused by the wastes in this sewer has been hampered for a number of years due to prolonged litigation between the city and an industry over damages to this sewer. Recently, a member of our staff has carried out several investigations of this problem in cooperation with the city. As a result recommendations as to treatment requirements were made to the city by the Ohio Department of Health staff. Furthermore, as a guideline, the staff provided the city water quality objectives for defining stormwater, which are in effect criteria for water quality for all uses. And a copy of this has been provided the Cleveland office of FWQA.

Industrial waste in the Ashtabula area, this is a problem of long standing. And while a lot of improvements have been made, conditions are still far from satisfactory. And I think we are going to have a workshop in Ashtabula so this will probably be taken up in detail there. But to correct this problem, the Board has requested or more or less ordered the industries to give serious consideration to a joint terminal facility for treatment of the combined industrial waste effluent from this field growth.

Just in conclusion, I would like to mention that one of the reasons -- not an excuse, but certainly it is a reason -- why we are behind on these schedules, particularly with regard to municipalities, is that we have lost practically a year and a half in trying to implement the $100 million bond issue that was passed in Ohio in November 1968, to provide the necessary funds to finance these projects from the State and the Federal Government. Of course, in the meantime, the Federal appropriations have been increased.

I am very happy to report that now our funding on the 30 percent basis for all projects is fully underway. And we have close to a half a billion dollar program over the next three or four years -- two or three years, hopefully -- underway. And we will be in process in one form or another in the construction stage within the next two or three years. This will certainly accelerate conditions considerably, we feel.

That's all. Thank you.

MR. STEIN: Thank you, Mr. Eagle, for a very extensive reort. The whole report, without objection, will appear in the record as if read.

(The above-mentioned report follows in its entirety.)

Reproduced from
best available copy.

[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

[illegible]
[illegible]

[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

MAY, 1970

[illegible]
[illegible]

E. W. ARNOLD, M.D.
DIRECTOR OF [illegible]

STATEMENT OF DIVISION OF ENGINEERING

OHIO DEPARTMENT OF HEALTH

Mr. Chairman, conferees, ladies and gentlemen, my name is George H. Eagle. I am Chief Engineer of the Ohio Department of Health. The Division of Engineering serves as the technical staff of the Ohio Water Pollution Control Board. On behalf of the Board and the Department. I wish to submit this report in its entity for the record.

This report is a progress evaluation of Ohio's program for compliance with the conclusions and recommendations of the Lake Erie Pollution Enforcement Conference of August 1965.

Municipal Programs

The conferees established corrective measures and schedules of construction for 95 municipalities involving 97 projects, 77 of these municipalities were to have the required facilities completed by December 31, 1969. The progress to date with respect to these requirements is as follows:

Number of municipalities requiring facilities by December 31, 1969 - 77

Number completed	35
Number under construction	10
Number - detail plans approved	12
Number - reports and general plans approved	11
Number remaining	9

Of the 10 projects under construction eight are to be completed this year, and two are to be completed during 1971. Of the 12 communities with approved detail plans, six are expected to complete the construction of their facilities during 1971 and three are expected to complete their facilities during 1972; two projects are being held up by litigations. Construction has been delayed for one small project to arrange for the necessary finances. Most of the area of this community is tributary to other facilities. Detail plans are currently in preparation for the 11 communities with approved reports and general plans. These plans are expected to be completed later this year or early next year. Upon approval of the detail plans, it is expected that construction will begin within 90 days and that construction will be completed late in 1971 or early 1972.

Three of the nine communities remaining have failed to make satisfactory progress in the planning of the required facilities. These communities, namely Avon, Independence and Oakwood have been ordered after public hearings by the Ohio Water Pollution Control Board to submit reports and general plans by September 1970. To prevent further water pollution from these communities, the Board has prohibited any new connections to the sewer systems of these communities which contribute additional pollution to waters of the state. In essence this means a freeze on any new building in these communities. Three more communities, namely Grand River. Northwood, and Waterville, are required to complete the necessary legislation and to provide the necessary sewers for conveying their municipal wastes to the facilities of another municipality. Two communities are preparing revised plans for facilities to accommodate expanded service areas. The ninth community finally hired an engineer in February of this year.

The schedules adopted by the conferees called for the completion of 15 more municipal projects by December 15, 1970. Five of these projects are currently under construction, two will be completed this year and the other three will be completed during 1971. Detail plans have been approved for the sixth municipality with construction to begin this fall. A seventh municipality is currently revising detail plans. Of the remaining eight municipalities six have failed to make satisfactory progress in planning the necessary facilities. As a result three have been ordered by the Board to prepare the required detail plans prior to January 1, 1971. These three municipalities are Broadview Heights, Euclid and Willoughby. In addition, Painesville and Amherst have been ordered to complete detail plans and general plans respectively by September 1970 and Fairport Harbor has been ordered to complete negotiations for connection to the Painesville systems. Furthermore, the Board has imposed a "freeze" on any new building in Painesville, Fairport Harbor and Broadview Heights. Of the remaining two, the city of Sandusky is required by current permit to initiate construction, and Delphos is required by permit to authorize the preparation of detail plans by June 1970.

The facilities under construction by the city of Akron are one of the two projects mentioned above to be completed this year. In fact, these facilities should be completed by July 1. Concurrently with the completion of this project three of the four major rubber companies will complete this fall, major pre-treatment facilities for the significant reduction of latexes discharged to the Akron city sanitary sewer system. A fourth company is expected to complete its latex removal facilities next spring. Also by next spring, facilities for the recovery of spent pickle liquors from a major operation now discharged to the sanitary sewer system will be placed in operation. The above waste increments have placed a major burden on and have interfered with the performance of the facilities of the city of Akron. These pre-treatment facilities are being installed in accordance with requirements of the Ohio Department of Health, working in cooperation with officials of the city. The industrial waste discharge of 40 other industrial discharges to the sewer system have been found to be in violation of City Code and orders for corrective measures have been issued by the city in accordance with the requirements of the city's permit from the Board. In view of the above, major improvements of the water quality of the Cuyahoga River downstream of Akron is expected by next summer.

The schedule adopted by the conferees for the completion of projects beyond 1970 are as follows. Cleveland-Westerly December 1971, Lake County-Madison Sewer District January 1, 1971, Lake County-Willoughby-Mentor Sewer District January 1, 1971, and Toledo February 1972. The facilities for the city of Toledo were placed under construction in April 1970. The Board has required by permits, detail plans for Madison Sewer District by October 1970 and general plans for Willoughby-Mentor by June 1970. The Board has also ordered the city of Cleveland to submit detail plans of improvements to the Westerly plant by November 1970. This order was given because the city of Cleveland failed to comply with earlier permit conditions calling for general and detail plans acceptable to the Division of Engineering. The orders of the Board were supplemented by a ban on additional pollution of waters of the state by the city.

Information on the status of compliance of each municipal project with the recommendations and conclusions of the conferees are given in Table 1, Appendix A.

Phosphorous Removal

At the last session of the conference Ohio's program for phosphorous removal was presented. Included was a list of those cities which have been required to install phosphorous removal facilities. Included were 15 facilities which discharge directly to Lake Erie and 20 facilities which discharge to Ohio tributaries to Lake Erie. The Ohio Department of Health has adopted a policy of requiring phosphorous removal at all plants with a design capacity of 1.0 mgd or more.

Major facilities now under construction and in a few instances nearing completion which will provide phosphorous removal include those of Ashtabula, Avon Lake, Cleveland-Easterly, Lorain, Port Clinton, Toledo, Akron, Defiance and Findlay. The last three discharge to tributary streams whereas the first six discharge directly to the Lake. The combined phosphorous load to these facilities is estimated to be 16,600 pounds per day or nearly half of the total estimated Ohio municipal load to Lake Erie. Phosphorous removal facilities at the Cleveland-Westerly plant have been in operation for a number of months with temporary facilities on an experimental basis.

Later this year major phosphorous removal facilities are expected to be placed under construction at Rocky River.

Industrial Programs

Completion schedules for facilities for the abatement of water pollution by discharges of industrial wastes to the waters of the state were adopted by the conferees for 97 Ohio establishments. In no instance did these dates extend beyond December 31, 1969. Sixty of the required projects have been completed, four other industries have ceased operations. Fifteen others have facilities under construction; thirteen of these are expected to be completed this year. Eleven others are expecting to connect to municipal sanitary sewer systems; five of these eleven are currently negotiating for connection to municipal sewers and the other six are awaiting the construction of municipal sewers in their areas. Plans of proposed facilities for five industries have been prepared and are awaiting approval. One other industry is planning to cease all operations this fall. Studies are underway at one plant which has built substantial in-plant facilities for the recovery of process chemicals.

One of the proposals for the discharge of industrial wastes to municipal sewers is rather unique and may be of interest to the conferees. The city of Cleveland is planning to accept the calcium sulfate wastes from the Harshaw Chemical Company, into its sewer system for conveyance to the Southerly plant. This waste is expected to aid substantially in the city's proposal for removal of phosphorous of this plant.

Water Quality Standards

As reported at the last session, the Ohio Water Pollution Control Board had adopted Water Quality Standards for all significant Ohio tributaries of Lake Erie. On April 14, 1970, the Board adopted amended criteria of stream water quality for various water uses. A copy of the Board's resolution is included in Appendix B. The amended criteria up grades waters classified as Aquatic Life A, Aquatic Life B, and recreational waters. The revised criteria for Aquatic Life A up grades the requirements for dissolved oxygen, water temperatures and pH. For Aquatic Life B the revised criteria up grades the requirements for dissolved oxygen and pH. The revised criteria for recreational water uses consists of a fecal coliform limit in place of the total coliform limit.

The above criteria are to be applied to all respective standards adopted by the Ohio Water Pollution Control Board for all tributaries of Lake Erie. Furthermore, these criteria are also to be applied to Lake Erie or portions thereof where such quality levels are better than existing water quality, otherwise existing quality levels are to prevail.

The amended criteria adopted by the Board on April 14, 1970 includes a policy statement with regards to the protection of high quality waters. This policy shall be applied to Lake Erie and all applicable sections of the tributary streams. To meet the Water Quality Standards established for Lake Erie and its tributaries will require, in a number of instances, treatment facilities or corrective measures in addition to those originally established by the conferees. In addition, further corrective measures are required as the result of expansions, changes in processes, annexations, population growth and the obsolescence of existing facilities. New or additional requirements to meet these conditions as set forth by permit conditions, board orders or the establishment of intrastate water quality standards for municipal facilities are given in Table 3, Appendix A, likewise the new or additional requirements for industrial establishments are given in Table 4, Appendix A.

Advanced Municipal Waste Treatment

For municipal wastes the standards call for the construction of advanced waste treatment facilities in a number of critical areas. The communities and/or facilities for which this requirement has already been established are as follows:

- Ada
- Akron
- Archbold
- Bryan
- Cleveland-Easterly
- Cleveland-Southerly
- Cleveland-Westerly
- Delphos
- Findlay
- Lima
- Van Wert
- Wapakoneta

The facilities for Findlay are currently under construction and detail plans of such facilities have been approved for Archbold and a report and general plan has been approved for Bryan. The current permits for the other communities call for the submission of reports and general plans for such facilities prior to the expiration date. In no instance, is a permit calling for improvements granted for a period of more than one year.

Also in accordance with the adopted Water Quality Standards most permits include a condition calling for the correction of excessive storm water problems and combined sewer overflows. The latter is a most serious problem in and around Cleveland. Failure of the city to provide an adequate program for the correction of this problem was an important factor in the Board's action of imposing a ban on any additional pollution of the "waters of the state" by the city.

Another serious problem is the use of a storm sewer of the city of Euclid for the conveyance of industrial wastes to Lake Erie. Legally the use of this sewer is under the jurisdiction of the city. Action towards correction of pollution caused by the wastes in this sewer has been hampered for a number of years due to prolonged litigation between the city and an industry over damages to this sewer. Recently, a member of our staff has carried out several investigations of this problem in cooperation with the city. As a result recommendations as to treatment requirements were made to the city by the Ohio Department of Health staff. Furthermore, as a guideline, the staff provided the city water quality objectives for defining storm water. A copy of these guidelines have been furnished to the Cleveland office of Federal Water Quality Administration for their comments.

Industrial Wastes - Ashtabula Area

The program of corrective measures adopted by the conferees for the industrial waste discharges from the chemical complex in the Ashtabula area were based on production and process operations at that time.

As originally conceived some of the wastes of one plant became a part of the raw materials of another plant. This is no longer the case with respect to hydrochloric acid which was produced as a by-product. Waste treatment facilities constructed in accordance with requirements of the conferees were not capable of treating the no longer saleable by-product. To cope with this problem additional corrective measures were required. Furthermore, the interaction of the treated wastes from these industries plus those who have recently constructed new plants is such that the waters in Fields Brook do not meet the criteria for asthetic conditions and the discharge of this stream into the Ashtabula River is such that it seriously degrades the water quality of the river. To correct this problem the Board has requested the industries to give serious consideration to a joint terminal facilities for treatment of the combined industrial waste effluents.

TABLE I. STATUS OF COMPLIANCE WITH REQUIREMENTS OF LAKE ERIE ENFORCEMENT CONFERENCE
MUNICIPAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	PRESENT SCHEDULES	REMARKS
		BLACK RIVER BASIN		
AVON	NEW TREATMENT FACILITIES (SECONDARY) FOR ENTIRE CITY.	DETAIL PLANS 6-15-69 CONSTRUCTION 12-15-69	SEE REMARKS	ORDERED TO: (1) REPORT BY 7/1/70 AND 9/1/70 STEPS TAKEN RE: FINANCING AND CONSTRUCTION OF SEWERS AND TREATMENT FACILITIES. (2) PLANS OF LATERAL SEWERS BY 9/70. (3) R & GP FOR FRENCH CREEK PROJECT. BUILDING FREEZE IMPOSED.
LORAIN	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 2-15-67 DETAIL PLANS 5-20-68	APPROVED	PLACED UNDER CONSTRUCTION 11/69.
		CHAGRIN RIVER BASIN		
AURORA	IMPROVEMENTS	REP. & G. PLAN - APPROVED DETAIL PLANS 4-15-67 CONSTRUCTION 10-15-69	APPROVED 4-15-70	UNDER CONSTRUCTION
GEAUGA COUNTY				
BAINBRIDGE TWP. S.D. #2 RAVENWOOD SUBDIV.	NONE	IN OPERATION 1966		COMPLETED
BAINBRIDGE TWP. S.D. #3	SEWERS & CONNECTION TO CHAGRIN FALLS SEWER SYSTEM	NEGOTIATIONS UNDERWAY	COMP. 9-15-70	
		CUYAHOGA RIVER BASIN		
AKRON	ADDITIONAL TREATMENT FACIL. (PHASE I - ADDITIONAL SECONDARY TREATMENT) (PHASE II - ADDITIONAL PRIMARY TREATMENT)	PHASE I - UNDER CONSTRUCTION PHASE II - DET. PLAN 9-15-67 CONSTRUCTION EARLY 1970	12-15-70	COMPLETED UNDER CONSTRUCTION COMPLETION EXPECTED BY 7/1/70
CLEVELAND	ADDITIONAL TREATMENT FACIL.	CONSTRUCTION 12-15-69	SEE REMARKS	WPCB HEARING CONTINUED TO 11-10-70. ORDERED: R & GP FOR FULL WASTE TREAT. BY 9-1-70; TEMPORARY CL2 BY 6/70. BUILDING FREEZE IMPOSED.

TABLE I. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	PRESENT SCHEDULES	REMARKS
		CUYAHOGA RIVER BASIN - CON'T.		
INDEPENDENCE	NEW TREATMENT FACIL. - SECONDARY	REP. & G. PLAN 6-15-67 DETAIL PLANS 6-15-68 CONSTRUCTION 12-15-69	6/70	ORDERED TO: (1) DETAIL PLANS FOR SEWERS. (2) COMPLETE NEGOTIATIONS FOR CONNECTION TO C.V.I.(T) BUILDING FREEZE IMPOSED.
KENT	COMPLETE CONSTRUCTION SECONDARY TREATMENT FACIL.	6/67		COMPLETED
MAPLE HEIGHTS	COMPLETE CONSTRUCTION NEW FACIL. - SECONDARY	4/67		COMPLETED
SOLON	COMPLETE CONSTRUCTION NEW N.E. FACILITIES	9/67		COMPLETED
MANTUA	NEW TREATMENT FACIL. - SECONDARY	UNDER CONSTRUCTION 4/67		COMPLETED
MIDDLEFIELD	IMPROVEMENTS - SECONDARY TREATMENT	DETAIL PLANS 6-15-67 CONSTRUCTION 9-15-68	APPROVED 12-15-70	LITIGATION PENDING
MONROE FALLS	SEWERS AND CONNECTION	PART OF SUMMIT COUNTY MUD BROOK PROJECT		COMPLETED. TRIB. TO AKRON
NORTHFIELD	NONE	IMPROVEMENTS COMPLETED 1965		COMPLETED
OAKWOOD (CUYAHOGA CO.)	NEW TREATMENT FACIL. - SECONDARY	REP. & G. PLAN 3-15-67 DETAIL PLANS 7-15-67 CONSTRUCTION 9-15-68	9-1-70	ORDERED TO PREPARE DETAIL PLANS AND INITIATE CONSTRUCTION BY 9-1-70. BUILDING FREEZE IMPOSED.
CUYAHOGA COUNTY				
BRECKSVILLE S.D. #13 (BRECKSVILLE)	IMPROVEMENTS - ADDITIONAL TREATMENT FACILITIES	REP. & G. PLAN 12-15-67	APPROVED	STUDYING CONNECTION TO CUYAHOGA VALLEY INTERCEPTOR REPORT BY 9-15-70
BRECKSVILLE S.D. #13 [illegible] ESTATES	NONE	COMPLETED IN 1966		COMPLETED

TABLE I. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	PRESENT SCHEDULES	REMARKS
		CUYAHOGA RIVER BASIN - CON'T.		
SUMMIT COUNTY STOW TWP. S.D.-PLANT 4	CONSTRUCTION OF INTERC. PROJECT	BIDS TAKEN 5-1-67		COMPLETED. TRIB. TO AKRON
		GRAND RIVER BASIN		
PAINESVILLE	IMPROVEMENTS - SECONDARY TREATMENT	IMP. & F. PLAN 12-31-67 DETAIL PLANS 9-30-68 CONSTRUCTION 12-31-70	APPROVED 9/70	ORDERED TO INITIATE CONSTRUCTION BY 9/70 BUILDING FREEZE IMPOSED
FAIRPORT HARBOR	IMPROVEMENTS - SECONDARY TREATMENT	IMP. & F. PLAN 7-15-67 DETAIL PLANS 5-15-68 CONSTRUCTION 10-15-70	2-8-70	ORDERED TO COMPLETE NEGOTIATIONS FOR CONNECTION TO PAINESVILLE OR AUTHORIZED DETAIL PLANS BY 9/6/70. BUILDING FREEZE IMPOSED.
GRAND RIVER	NEW TREATMENT FACIL. - SECONDARY	DETAIL PLANS 10-15-67 CONSTRUCTION 10-15-69	SEE REMARKS	REQUIRED TO COMPLETE LEGISLATION TO PARTICIPATE IN COUNTY S.D. BY 10-15-70
ORWELL	NEW TREATMENT FACIL. - SECONDARY	DETAIL PLANS 3-15-67 CONSTRUCTION 11-15-68		COMPLETED 6/69
		HURON RIVER BASIN		
HURON	IMPROVEMENTS - SECONDARY TREATMENT	IMP. & F. PLAN 6-15-67 DETAIL PLANS 6-15-69 CONSTRUCTION 11-15-70	6-1-71 6-1-71	ORIGINAL PLANS HELD UP TO INCLUDE A NEW INDUSTRY. NEW INDUSTRY CANCELLED PLANS FOR LOCATING HERE.
NORWALK	IMPROVEMENTS - SECONDARY TREATMENT	CONSTRUCTION 12-15-68		COMPLETED 2/69
MILAN	NEW TREATMENT FACIL. - SECONDARY	BIDS 9-22-67		COMPLETED 3/69
MONROEVILLE	IMPROVEMENTS - SECONDARY TREATMENT	IMP. & F. PLAN 6-15-67 DETAIL PLANS 6-15-68 CONSTRUCTION 12-15-69	APPROVED 12-15-70	[illegible] 3/70

TABLE I. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	PRESENT SCHEDULES	REMARKS
		HURON RIVER BASIN - CON'T.		
PLYMOUTH	NONE	CONSTRUCTION COMPLETE 1966		COMPLETED
		MAUMEE RIVER BASIN		
DEFIANCE	IMPROVEMENTS - SECONDARY TREATMENT	DETAIL PLANS 9-15-67 CONSTRUCTION 8-15-69	APPROVED 9-15-70	PLACED UNDER CONSTRUCTION 4/69. COMPLETION EXPECTED 7/70.
DELPHOS	IMPROVEMENTS - ADDITIONAL TREATMENT FACILITIES	REP. & G. PLAN 3-15-68 DETAIL PLANS 3-15-69 CONSTRUCTION 9-15-70	6-15-70	REQUIRED TO AUTHORIZE DETAIL PLANS BY 6/70
FINDLAY	IMPROVEMENTS - (INCL. DISINFECTION)	REP. & G. PLAN APPROVED DETAIL PLANS 7-15-67 CONSTRUCTION 6-15-69	APPROVED 6-15-70	UNDER CONSTRUCTION COMPLETION EXPECTED 7/70
PERRYSBURG	IMPROVEMENTS - SECONDARY TREATMENT & DISINFECTION	REP. & G. PLAN 6-15-67 DETAIL PLANS 6-30-68 CONSTRUCTION 12-31-69	APPROVED APPROVED	REQUIRED TO INITIATE CONSTRUCTION BY 12/70
ST. MARYS	IMPROVEMENTS - (INCL. DISINFECTION)	DETAIL PLANS 6-15-67 CONSTRUCTION 6-15-69		COMPLETED 1969
TOLEDO	IMPROVEMENTS - SLUDGE HANDLING FACILITIES TREATMENT FACILITIES	UNDER CONSTRUCTION 2/67 REP. & G. PLAN 7-15-67 DETAIL PLANS 9-15-68 CONSTRUCTION 2/72	APPROVED	PLACED UNDER CONSTRUCTION 4/70
VAN WERT	IMPROVEMENTS - ADDITIONAL TREATMENT FACILITIES	REP. & G. PLAN 6-15-67 DETAIL PLANS 9-15-68 CONSTRUCTION 12-15-69	11-15-70	REQUIRED TO INITIATE CONSTRUCTION BY 11/70 COMPLETION EARLY 1972
[illegible]	IMPROVEMENTS - INCL. SECONDARY TREATMENT	REP. & G. PLAN 6-15-67 DETAIL PLANS 6-15-68 CONSTRUCTION 12-15-69	APPROVED 10-15-70	
[illegible]	IMPROVEMENTS - ADDITIONAL TREATMENT FACILITIES	[illegible] CONSTRUCTION [illegible] 12-15-67		COMPLETED

TABLE I. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	PRESENT SCHEDULES	REMARKS
		MAUMEE RIVER BASIN - CON'T.		
CRIDERSVILLE	NONE	TREAT. FACIL. COMPLETED 1966		COMPLETED
ELIDA	COMPLETE NEW FACILITIES INCL. SECONDARY TREATMENT	UNDER CONSTRUCTION IN OPERATION 7/67		COMPLETED
FOREST	COMPLETE NEW FACILITIES INCL. SECONDARY TREATMENT	UNDER CONSTRUCTION IN OPERATION 6/67		COMPLETED
HAMLER	NEW FACILITIES - INCL. SECONDARY TREATMENT	DETAIL PLANS 5-15-68 CONSTRUCTION 12-15-69	APPROVED	BIDS TAKEN 4/70
HASKINS	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 5-15-67 DETAIL PLANS 7-15-68 CONSTRUCTION 12-15-69	3-15-70	FAILED TO SUBMIT DETAIL PLANS AS SCHEDULED. EXTENSION OF SCHEDULE UNDER CONSIDERATION.
HOLGATE	NEW FACILITIES - INCL. SECONDARY TREATMENT	DETAIL PLANS 3-15-67 CONSTRUCTION 5-30-68	SEE REMARKS	HIRED ENGINEER 2/70. PERMIT DENIED. PROSECUTION DEFERRED.
LIBERTY CENTER	NEW FACILITIES - INCL. SECONDARY TREATMENT	REP. & G. PLAN 9-15-67 DETAIL PLANS 7-15-68 CONSTRUCTION 12-15-69	APPROVED 2-15-71	
MONTPELIER	IMPROVEMENTS - SECONDARY TREATMENT	DETAIL PLANS 2-15-68 CONSTRUCTION 12-15-69	APPROVED	REQUIRED TO INITIATE CONSTRUCTION BY 8/15/70
NORTH WOOD	NEGOT. AGREEMENTS WITH TOLEDO AND WOOD COUNTY FOR SEWER CONNECTION TO CITY SEWER SYSTEM.	REPORT BY 9-15-67 NOW IN COUNTY SEWER DISTRICT		REQUIRED TO SUBMIT DETAIL PLANS FOR SEWERS AND CONNECTION TO WOOD CO. 9/70
OHIO CITY	NEW FACILITIES - INCL. SECONDARY TREATMENT	DETAIL PLANS 9-1-67 CONSTRUCTION 12-15-68		COMPLETED 1969
OTTAWA	IMPROVEMENTS - ADDITIONAL CAPACITY	REP. & G. PLAN 7-15-67	APPROVED COMPL. 3-15-71	UNDER CONSTRUCTION COMPLETION THIS YEAR
PANDORA	NEW FACILITIES - INCL. SECONDARY TREATMENT	DETAIL PLANS APPROVED CONSTRUCTION 1-15-69	COMPL. 3-15-71	PLACED UNDER CONSTRUCTION 2/70

TABLE I. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	PRESENT SCHEDULES	REMARKS
		MAUMEE RIVER BASIN - CON'T.		
PAYNE	NEW FACILITIES - INCL. SECONDARY TREATMENT	UNDER CONSTRUCTION EARLY 1967 IN OPERATION EARLY 1968		COMPLETED
ROCKFORD	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 9-15-67 DETAIL PLANS 6-15-68 CONSTRUCTION 8-15-69	4-15-71	REQUIRED TO COMPLETE DETAIL PLANS & FINANCING BY 4-15-71
SHERWOOD	NEW FACILITIES - INCL. SECONDARY TREATMENT	REP. & G. PLAN 9-15-67 DETAIL PLANS 5-15-69 CONSTRUCTION 9-15-69	4-15-70	FAILED TO SUBMIT DETAIL DETAIL PLANS AS SCHEDULED. EXTENSION OF SCHEDULE UNDER CONSIDERATION.
STRYKER	NONE	TREAT. FACIL. COMPLETED 1965		COMPLETED
WATERVILLE	IMPROVEMENTS TO TREATMENT FACILITIES	REP. & G. PLAN 7-15-67 DETAIL PLANS 7-15-68 CONSTRUCTION 12-15-69		REQUIRED TO SUBMIT AN AGREEMENT FOR CONNECTION TO LUCAS CO. JEROME RD. STP BY 12/70
WEST LEIPSIC	FINANCIAL PROBLEM - TO TAKE TRIBUTARY TO LEIPSIC			
WESTON	CONSTRUCTION OF FACILITIES PENDING	12/66 BIDS OVER ESTIMATE; FINANCIAL PROBLEM		COMPLETED
WEST UNITY	NEW FACILITIES - INCL. SECONDARY TREATMENT	DETAIL PLANS 6-15-67 CONSTRUCTION 12-15-69	APPROVED COMPL. 5/71	BIDS TAKEN 4/70
		OTTAWA RIVER BASIN		
SYLVANIA	FLOW IN EXCESS OF PLANT CAPACITY TO BE DISCHARGED TO TOLEDO SEWER SYSTEM	CONSTRUCTION COMPLETE BY 6/67		COMPLETED
LUCAS COUNTY [illegible]	NEW FACILITIES - INCL. [illegible]	REP. & G. PLAN 3-15-67 [illegible] [illegible]	9-1-70 6-1-72	THE SCOPE OF THIS PROJECT HAS BEEN ENLARGED TO INCLUDE AREAS PREVIOUSLY NOT CONSIDERED

TABLE I. - CONTINUED

ENTITY	[illegible]	[illegible] SCHEDULE (COMPLETION DATES)	[illegible]	REMARKS
		PORTAGE RIVER BASIN		
PORT CLINTON	IMPROVEMENTS - SECONDARY TREATMENT	DETAIL PLANS 6-15-67 CONSTRUCTION [illegible]-15-69	APPROVED	UNDER CONSTRUCTION COMPLETION EXPECTED 1970
BLOOMDALE	NEW FACILITIES - INCL. SECONDARY TREATMENT	DETAIL PLANS 2-15-67 CONSTRUCTION 12-15-69	9-15-70	
ELMORE	NEW FACILITIES - INCL. SECONDARY TREATMENT	DETAIL PLANS 12-15-67 CONSTRUCTION 12-15-69		COMPLETED 6/69
McCOMB	IMPROVEMENTS - SECONDARY TREATMENT	DETAIL PLANS APPROVED CONSTRUCTION 12-15-68		COMPLETED 4/69
OAK HARBOR	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 2-15-67 DETAIL PLANS 9-15-68 CONSTRUCTION 12-15-69	APPROVED 1-15-71	
PEMBERVILLE	NEW FACILITIES - INCL. SECONDARY TREATMENT	REP. & G. PLAN 6-15-67 DETAIL PLANS 12-15-68 CONSTRUCTION 12-15-69	APPROVED	REQUIRED TO INITIATE CONSTRUCTION BY 7/70
WOODVILLE	NEW FACILITIES - INCL. SECONDARY TREATMENT	REP. & G. PLAN 2-15-67 DETAIL PLANS 9-15-68 CONSTRUCTION 12-15-69	APPROVED 6/70	PLACED UNDER CONSTRUCTION 5/69. COMPLETION EXPECTED IN 1970.
		ROCKY RIVER BASIN		
BEREA	IMPROVEMENTS - ADDITIONAL TREATMENT FACILITIES	UNDER CONSTRUCTION 1967 CONSTRUCTION 6-1-69		COMPLETED 11/68
BROADVIEW HEIGHTS	NEW FACILITIES - INCL. SECONDARY TREATMENT	DETAIL PLANS 1-1-68 CONSTRUCTION 12-31-70	3-1-70	UNDER ORDERS TO PREPARE DETAIL PLANS. BUILDING FREEZE IMPOSED.
MIDDLEBURGH HEIGHTS	NEW FACILITIES - INCL. SECONDARY TREATMENT (SAME AS [illegible] HEIGHTS S.D.)	PLANS 4-2-67 UNDER CONSTRUCTION 5/67 CONSTRUCTION 12/68		COMPLETED 12/68
STRONGSVILLE		CONSTRUCTION COMPLETED IN 1965		COMPLETED

TABLE 2. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	PRESENT SCHEDULES	REMARKS
		ROCKY RIVER BASIN - CON'T.		
OLMSTED FALLS	NEW FACILITIES - INCL. SECONDARY TREATMENT	TO ADVERTISE FOR BIDS 5/67		REQUIRED TO REVISE DETAIL PLANS TO INCLUDE RECENTLY ANNEXED AREA. PLACE UNDER CONSTRUCTION PRIOR TO 4/71.
CUYAHOGA COUNTY MIDDLEBURG HEIGHTS S.D.	SAME AS CITY OF MIDDLEBURG HEIGHTS ABOVE			COMPLETED 12/68
LORAIN COUNTY SEWER DISTRICT #9 WEST VIC. PARK SUBDIV.	SEWERS & NEW TREATMENT FACILITIES - SECONDARY	REP. & G. PLAN 3-1-67 DETAIL PLANS 6-1-67 CONSTRUCTION 12/68	APPROVED 9/69	COMPLETED 9/69
		SANDUSKY RIVER BASIN		
FREMONT	NONE	COMPLETED CONSTRUCTION 1966		COMPLETED
TIFFIN	INTERCEPTORS - SECONDARY TREATMENT	UNDER CONSTRUCTION 9-15-67 CONSTRUCTION 7-15-69		COMPLETED
ATTICA	NEW FACILITIES - INCL. SECONDARY TREATMENT	REP. & G. PLAN 6-15-67 DETAIL PLANS 6-15-68 CONSTRUCTION 10-15-69	APPROVED 3-15-71	PLACED UNDER CONSTRUCTION 1/70.
BLOOMVILLE	NEW FACILITIES - INCL. SECONDARY TREATMENT	REP. & G. PLAN 9-15-67 DETAIL PLANS 6-15-68 CONSTRUCTION 10-15-69		COMPLETED 2/70
UPPER SANDUSKY	INTERCEPTORS - ADDITIONAL TREATMENT FACILITIES	REP. & G. PLAN 3-15-69 DETAIL PLANS 9-15-69 CONSTRUCTION 9-15-70	APPROVED 5-15-70	DETAIL PLANS APPROVED 3/70. SCHEDULED TO PLACE UNDER CONSTRUCTION BY 10/70.
SANDUSKY COUNTY SEWER DISTRICT 1	SEWERS & CONNECTION TO [illegible]	DETAIL PLANS [illegible]-15-69 CONSTRUCTION [illegible]		[illegible]

TABLE I. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	PRESENT SCHEDULES	REMARKS
		SANDUSKY RIVER BASIN - CON'T.		
SENECA COUNTY CLINTON TOWNSHIP	SEWERS & CONNECTION TO TIFFIN SEWER SYSTEM	DETAIL PLANS 11-15-67 CONSTRUCTION 1968		PLANS FOR PART OF AREA APPROVED. REQUIRED BY 10/70. 1. SUBMIT PLANS FOR MELMORE ST. AREA 2. SUBMIT AGREEMENT WITH TIFFIN 3. PLACE BOTH PROJECTS UNDER CONSTRUCTION BY 10/70
		VERMILION RIVER BASIN		
VERMILION	NEW FACILITIES - INCL. SECONDARY TREATMENT	UNDER CONSTRUCTION 3/67 CONSTRUCTION 3/69		COMPLETED 12/68
		TRIBUTARY TO LAKE ERIE		
AMHERST	IMPROVEMENTS - ADDITIONAL TREATMENT FACILITIES	REP. & G. PLAN 12-15-67 DETAIL PLANS 12-15-68 CONSTRUCTION 6-15-70	8/70	ORDERED TO COMPLETE BY 8/70. 1. REPORT & GENERAL PLAN 2. TEMPORARY CL_2 FACILITIES
BELLEVUE	NEW FACILITIES - INCL. SECONDARY TREATMENT	UNDER CONSTRUCTION EARLY 1967 CONSTRUCTION 9-1-69	2/71	UNDER CONSTRUCTION COMPLETION EXPECTED BY 2/71
CONNEAUT	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 3-15-67 DETAIL PLANS 1-15-68 CONSTRUCTION 10-15-69	APPROVED 9/70 12/71	REQUIRED TO TAKE BIDS BY 11/70.
WESTLAKE	CONNECTION TO COUNTY SEWER DISTRICT SYSTEM	DEPENDS ON CURRENT LITIGATION RE FINANCING (CUYAHOGA COUNTY PROJECT)		SEWERS UNDER CONSTRUCTION
GREEN SPRINGS	IMPROVEMENTS - SECONDARY TREATMENT	DETAIL PLANS 7-15-67 CONSTRUCTION 12-15-68	APPROVED 1-15-71	PLACED UNDER CONSTRUCTION 5/69. COMPLETION EXPECTED 1970.
MADISON	COMPLETELY NEW FACILITIES - SECONDARY TREATMENT	CONSTRUCTION 6/67		COMPLETED

TABLE I. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	PRESENT SCHEDULES	REMARKS
		TRIBUTARY TO LAKE ERIE - CON'T.		
WALBRIDGE	COMPLETE SEWER CONNECTION TO TOLEDO SEWER SYSTEM	UNDER CONSTRUCTION TO COMPLETE CONNECTION 6-15-67		COMPLETED
ERIE COUNTY	NEW TREATMENT FACILITIES (SECONDARY) OR CONNECTION TO CITY OF SANDUSKY SEWER SYSTEM	REP. & G. PLAN EARLY 1967 ·DETAIL PLANS 8-1-68 CONSTRUCTION 12-15-69		CONNECTION COMPLETED. EXTENSION OF SEWERS REQUIRED.
		DIRECT TO LAKE ERIE		
ASHTABULA	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 3-15-67 DETAIL PLANS 6-15-63 CONSTRUCTION 10-30-70	APPROVED	PLACED UNDER CONSTRUCTION 6/69. COMPLETION EXPECTED IN 1970.
AVON LAKE	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN EARLY 1967 DETAIL PLANS 2-15-68 CONSTRUCTION 1970	APPROVED 4-15-71	PLACED UNDER CONSTRUCTION 3/70. COMPLETION EXPECTED 1971.
CLEVELAND				
-EASTERLY PLANT	ADDITIONAL TREATMENT FACILITIES	CONSTRUCTION 7-15-70		CHLORINE CONTACT TANK PLUS ENLARGEMENT OF PRIMARY AND SECONDARY TREATMENT FACILITIES PLACED UNDER CONSTRUCTION 12/69. BUILDING FREEZE IMPOSED.
-WESTERLY PLANT	ADDITIONAL TREATMENT FACILITIES	CONSTRUCTION 12-15-71		STUDIES ON CHEMICAL TREATMENT COMPLETED. ORDERED TO: 1. INSTALLED TEMPORARY CL2 FACILITIES BY 6/70 2. SUBMIT DETAIL PLANS BY 11/70
EUCLID	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 5-1-67 DETAIL PLANS 6-1-68 CONSTRUCTION 6-30-70	4-15-71 12-1-72	REQUIRE TO BY 10/70 1. COMPLETE PILOT PLANT STUDIES 2. INITIATE DETAIL PLANS FOR TREATMENT 3. COMPLETE DETAIL PLANS FOR SLUDGE DISPOSAL FACILITIES

TABLE I. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	PRESENT SCHEDULES	REMARKS
		DIRECT TO LAKE ERIE - CON'T.		
OREGON	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN EARLY 1967 DETAIL PLANS 7-30-68 CONSTRUCTION 12-30-69	APPROVED	REQUIRED TO INITIATE CONSTRUCTION BY 12-15-69
	(PART TRIB. TO TOLEDO; REMAINDER NO PUB. SEWERS)			
SANDUSKY	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN EARLY 1967 DETAIL PLANS 6-30-68 CONSTRUCTION 11-30-70	APPROVED	REQUIRED TO INITIATE CONSTRUCTION BY 3/71
WILLOUGHBY	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 4-15-67 DETAIL PLANS 7-15-68 CONSTRUCTION 7-15-70	APPROVED 1/71	SHOW CAUSED HEARING CONTINUED TO 1/71. DETAIL PLANS ORDERED TO BE APPROVED PRIOR TO THAT DATE.
GENEVA-ON-THE-LAKE	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 6-15-67 DETAIL PLANS 6-15-68 CONSTRUCTION 12-15-69	APPROVED 12/70	
HARBOR VIEW		TO BE TRIBUTARY TO OREGON'S SEWER SYSTEM. (SEE OREGON ABOVE)		
CUYAHOGA COUNTY ROCKY RIVER S.D. #6	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN EARLY 1967 DETAIL PLANS 6-15-67 CONSTRUCTION 9-15-69	APPROVED APPROVED	BIDS TO BE TAKEN 6/70
ERIE COUNTY E. ERIE CO. S & WD RUGGLES BEACH-WITTIWANGA	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 3-1-67 DETAIL PLANS 9-1-68 CONSTRUCTION 12-15-69	APPROVED APPROVED	
LAKE COUNTY				
MADISON S.D. #1	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 1-1-68 DETAIL PLANS 1-1-69 CONSTRUCTION 1-1-71	APPROVED 10/70	
WILLOUGHBY-MENTOR S.D.	IMPROVEMENTS - SECONDARY TREATMENT	REP. & G. PLAN 1-1-68 DETAIL PLANS 1-1-69 CONSTRUCTION 1-1-71	6-1-70 1-1-71	

(1) CUYAHOGA VALLEY INTERCEPTOR

TABLE II. STATUS OF COMPLIANCE WITH REQUIREMENTS OF LAKE ERIE ENFORCEMENT CONFERENCE
INDUSTRIAL WASTE TREATMENT FACILITIES
LAKE ERIE DRAINAGE AREA IN OHIO

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	REMARKS
		ASHTABULA RIVER BASIN	
CABOT TITANIA CORPORATION TITANIUM DIOXIDE PLANT (NOW CABOT TITANIA INCORPORATED)	ADDITIONAL FACILITIES FOR REDUCTION OF SOLIDS	COMPLETED 9-1-66	COMPLETED*
CABOT TITANIA CORPORATION TITANIUM TETRACHLORIDE UNIT (NOW CABOT TITANIA INCORPORATED)	ADDITIONAL FACILITIES FOR REDUCTION OF SOLIDS	PLANS 1/67 CONSTRUCTION 6-1-67	COMPLETED*
DETREX CHEMICAL INDUSTRIES, INC. CHLORINATED SOLVENTS DIVISION	IN-PLANT CONTROL OF HYDROCARBONS	COMPLETED 2-1-67	COMPLETED*
DIAMOND ALKALI COMPANY SEMI-WORKS (NOW DIAMOND SHAMROCK CHEMICAL CO. SEMI-WORKS)	ADDITIONAL FACILITIES AND CONTROL FOR SOLIDS REDUCTION	COMPLETED 9-1-66	COMPLETED*
THE GENERAL TIRE & RUBBER COMPANY CHEMICAL DIVISION	ADDITIONAL FACILITIES AND CONTROL FOR SOLIDS	COMPLETED 12-1-66	COMPLETED*
OLIN MATHIESON CHEMICAL CORP. TDI FACILITY (NOW OLIN CORPORATION ORGANIC & SPECIALTY CHEMICALS DIV.)	IN-PLANT IMPROVEMENTS FOR NEUTRALIZATION AND SOLIDS	COMPLETED 12/66	COMPLETED*
REACTIVE METALS, INC. METALS REDUCTION PLANT	ADDITIONAL FACILITIES FOR SOLIDS REMOVAL	GENERAL PLANS 9-1-66 DETAIL PLAN 6-1-67	COMPLETED*
REACTIVE METALS, INC. SODIUM & CHLORINE PLANT	ADDITIONAL IN-PLANT CONTROLS FOR SOLIDS REDUCTION	CONSTRUCTION 10-1-67 COMPLETED 12/66	COMPLETED*

*THE REQUIREMENTS ESTABLISHED BY THE LAKE ERIE ENFORCEMENT CONFERENCE FOR THESE PLANTS WERE BASED ON PLANT PRODUCTION AND OPERATING CONDITIONS AS WELL AS THE INDUSTRIAL WASTE CHARACTERISTICS OF THESE INDUSTRIES AS OF 1965. THESE REQUIREMENTS HAVE BEEN COMPLETED. HOWEVER, SUBSEQUENT CHANGES IN PRODUCTION AND OPERATIONS HAVE ALTERED THE CHARACTER OF SOME OF THESE WASTES AND IN A FEW INSTANCES THE INSTALLED FACILITIES PROVED TO BE INADEQUATE. THE INSTALLED FACILITIES WERE NOT CAPABLE OF EFFECTIVELY TREATING THE INDUSTRIAL WASTES. THE ADDITIONAL REQUIREMENTS ESTABLISHED FOR THESE INDUSTRIES AS THE RESULT OF WATER QUALITY STANDARDS OR ORDERS OF THE OHIO WATER POLLUTION CONTROL BOARD ARE SHOWN IN TABLE A.

TABLE II. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	REMARKS
		BLACK RIVER BASIN	
LOCKE MANUFACTURING COMPANY	DISCHARGE TO MUNICIPAL SYSTEM	COMPLETED 7-1-66	COMPLETED
REPUBLIC STEEL CORPORATION STEEL AND TUBES DIVISION	REDUCTION OF ACIDS	PLANS 6-1-68 CONSTRUCTION 12-31-69	COMPLETED. SPENT ACID HAULED AWAY STARTING 12/69.
TERNSTEDT DIVISION GENERAL MOTORS CORPORATION (NOW FISHER BODY DIV. GENERAL MOTORS CORP.)	EXPANDED TREATMENT FACILITIES UNDER CONSTRUCTION	CONSTRUCTION 11-15-67	COMPLETED
U.S. STEEL CORPORATION TUBULAR OPERATIONS	ADDITIONAL REDUCTION OF SOLIDS	STUDY REPORT 6-1-67 CONSTRUCTION 12-31-69	COMPLETED. IN OPERATION 12/69
		CHAGRIN RIVER BASIN	
CHASE BAG COMPANY	SECONDARY TREATMENT FACILITIES	PLANS 6-1-68 CONSTRUCTION 12-31-69	GENERAL PLANS SUBMITTED FOR SOLIDS REMOVAL. COMPLETION EXPECTED 8/71.
		CUYAHOGA RIVER BASIN	
ASTORIA PLATING CORPORATION	ADDITIONAL FACILITIES FOR REDUCTION OF METALS AND CYANIDE	PLANS 8-1-67 CONSTRUCTION 1-1-68	PRE-TREATMENT FACILITIES COMPLETED. CONTRACTS WITH MUNICIPALITIES FOR CONNECTING IN PREPARATION.
THE BAILEY WALL PAPER COMPANY	COMPANY PLANS TO MOVE TO NEW LOCATION ON PUBLIC SEWER	7-1-67	CEASED OPERATION
THE CUYAHOGA MEAT COMPANY	NEW COMPLETE TREATMENT FACILITIES	PLANS 8-1-67 COMPLETE CONSTRUCTION 6-1-68	COMPLETED 5/70
DIAMOND CRYSTAL SALT COMPANY	ADDITIONAL REDUCTION OF CHLORIDES	PLANS 6-1-67 CONSTRUCTION 1-1-69	COMPLETED
E.I. DU PONT DE NEMOURS AND CO., INC. INDUSTRIAL & BIOCHEMICALS DEPT.	IMPROVEMENTS TO TREATMENT AND DISPOSAL FACILITIES	COMPLETED 9-1-66	COMPLETED

TABLE II. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	REMARKS
		CUYAHOGA RIVER BASIN - CON'T.	
FERRO CHEMICAL DIVISION OF FERRO CORP.	IMPROVEMENTS TO TREATMENT FACILITIES	PLANS 10-1-66 CONSTRUCTION 4-1-67	COMPLETED
FIRESTONE TIRE & RUBBER CO. AKRON PLANT	REDUCTION OF ALL CRITICAL CONSTITUENTS	PLANS 1-1-68 CONSTRUCTION 1-1-69	ALL PROJECTS COMPLETED 5/70
GENERAL TIRE & RUBBER CO. AKRON PLANT	REDUCTION OF ALL CRITICAL CONSTITUENTS	PLANS 1-1-68 CONSTRUCTION 1-1-69	ALL PRE-TREATMENT FACILITIES COMPLETED. CONNECTED TO MUNICIPAL SEWERS. COMPANY NOW EXEMPT FROM PERMIT.
B. F. GOODRICH RUBBER COMPANY AKRON PLANT	REDUCTION OF ALL CRITICAL CONSTITUENTS	PLANS 1-1-68 CONSTRUCTION 1-1-69	ONE PROJECT COMPLETED 2/69. DETAIL PLANS OF OPPORTUNITY PARK WASTE EFFLUENT FLUME AND TREATMENT FACILITIES RECEIVED 5-15-70. COMPLETION EXPECTED 3/72. PROJECT BEING CARRIED OUT IN COOPERATION WITH AKRON PARK BOARD PLANS OF RESTORING THE OHIO CANAL.
GOODYEAR AEROSPACE CORPORATION	FACILITIES FOR PRE-TREATMENT AND DISCHARGE TO MUNICIPAL SEWERS	PLANS 6-1-67 CONSTRUCTION 6-1-68	COMPLETED 2/69
GOODYEAR TIRE & RUBBER CO. AKRON PLANT	REDUCTION OF ALL CRITICAL CONSTITUENTS	PLANS 1-1-68 CONSTRUCTION 1-1-69	COMPLETED 2-17-70
HARSHAW CHEMICAL COMPANY DIV. OF KEWANEE OIL CO.	ADDITIONAL IN-PLANT CONTROL OF METALS & FLUORIDES. SETTLEABLE SOLIDS REMOVAL	PLANS 7-1-67 CONSTRUCTION 12-31-68	REDUCTION OF METALS COMPLETED. NEGOTIATING CONTRACT FOR DISCHARG OF OTHER INDUSTRIAL WASTE TO MUN. SEWERS.
JONES & LAUGHLIN STEEL CORP.	DISPOSAL OR TREATMENT OF WASTE PICKLING ACIDS	PLANS 6-1-67 CONSTRUCTION 8-1-67	ALL SPENT ACID HAULED AWAY COMPLETED 11/68
[illegible] STEEL CORP.	IMPROVED REDUCTION OF SOLIDS FROM BLAST FURNACE	PLANS 6-1-68 CONSTRUCTION 12-31-69	COMPLETED 12/68
[illegible] STEEL CORP.	[illegible]	PLANS 6-1-68 CONSTRUCTION 12-31-69	COMPLETED
[illegible], INC.	[illegible]	CONSTRUCTION 7-1-65	COMPLETED

TABLE IV. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	REMARKS
		CUYAHOGA RIVER BASIN - CON'T.	
MASTER ANODIZERS & PLATERS, INC.	IMPROVED REDUCTION OF METALS & SOLIDS	PLANS APPROVED 1/67 CONSTRUCTION 7-1-67	COMPLETED
REPUBLIC STEEL CORPORATION			
BOLT & NUT DIVISION	PLATING WASTES TO MUNICIPAL SEWERS.	CONSTRUCTION 12-31-69	PRE-TREATMENT FACILITIES COMPLETED. CONNECTED TO MUNICIPAL SEWER.
	REMOVAL OR TREATMENT OF WASTE PICKLING LIQUORS	PLANS 6-1-69 CONSTRUCTION 12-31-69	COMPLETED 12/69. STRONG ACID HAULED AWAY.
CLEVELAND DISTRICT	REMOVAL OR TREATMENT OF WASTE PICKLING LIQUORS	PLANS 6-1-66 CONSTRUCTION 12-31-69	COMPLETED 12/69. STRONG ACID HAULED AWAY
CLEVELAND DISTRICT	IMPROVED REDUCTION OF SUSPENDED SOLIDS FROM BLAST FURNACE	PLANS 6-1-68 CONSTRUCTION 12-31-69	ADDITIONAL FACILITIES FOR BLAST FURNACES 1,2,3,5 UNDER CONSTRUCTION. COMPLETION EXPECTED 1970.
CLEVELAND DISTRICT	IMPROVED REDUCTION OF SUSPENDED SOLIDS FROM MILL SCALE	PLANS 6-1-68 CONSTRUCTION 12-31-69	UNDER CONSTRUCTION. COMPLETION EXPECTED 1970.
SONOCO PRODUCTS COMPANY OHIO DIVISION	CONNECT TO COUNTY SEWER	CONSTRUCTION 1-30-69	UNDER CONSTRUCTION. COMPLETION EXPECTED 1970.
THE STANDARD OIL COMPANY NO. 1 REFINERY	REFINERY OPERATIONS DISCONTINUED. WASTES FROM ASPHALT PROCESSING TO BE MADE TRIBUTARY TO CLEVELAND MUNICIPAL SEWERS.	CONSTRUCTION 6-1-67	CEASED OPERATION
SHERWIN WILLIAMS LINSEED OIL MILL	DISCHARGE OF FILTRATE TO CLEVELAND MUNICIPAL SEWERS		CONNECTED TO MUNICIPAL SEWERS
U.S. STEEL CORPORATION			
CENTRAL FURNACES	ADDITIONAL REDUCTION OF SUSPENDED SOLIDS FROM BLAST FURNACE	PLANS 6-1-68 CONSTRUCTION 12-31-69	COMPLETED 3/70
CENTRAL FURNACES	SEWAGE TO MUNICIPAL SEWERS	CONSTRUCTION 12-3-66	CONNECTED TO MUNICIPAL SEWER
CUYAHOGA WORKS	NEUTRALIZATION OF PICKLING ACIDS AND REMOVAL OF SOLIDS AND METALS	GENERAL PLAN 11/66 DETAIL PLANS 3/67 CONSTRUCTION 12/68	COMPLETED. STRONG ACIDS HAULED AWAY
CUYAHOGA WORKS	ADDITIONAL REDUCTION OF SUSPENDED SOLIDS AND OIL FROM MILL SCALE	GENERAL PLANS 11/66 DETAIL PLANS 3/67 CONSTRUCTION 12/69	COMPLETED 7/69

TABLE II. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	REMARKS
	CUYAHOGA RIVER BASIN - CON'T.		
WEATHER-TITE COMPANY (NOW WEATHER-TITE DIV. THE PACIFIC COAST CO.)	NEUTRALIZATION AND REDUCTION OF SOLIDS	DETAIL PLANS 10/66 CONSTRUCTION 7/67	COMPLETED 10/69
	GRAND RIVER BASIN		
DIAMOND ALKALI COMPANY (NOW DIAMOND SHAMROCK CHEM. CO. A UNIT OF DIAMOND SHAMROCK CORP.)	REDUCTION OF CHROME WASTES. ADDITIONAL FACILITIES FOR NEUTRALIZATION & SOLIDS REDUCTION	PLANS 3-1-67 CONSTRUCTION 10-1-67 PLANS 6-1-67 CONSTRUCTION 6-1-68	COMPLETED COMPLETED
THE METAL CRAFT COMPANY	NEUTRALIZATION & REDUCTION OF SOLIDS	PLANS [illegible]-1-67 CONSTRUCTION 6-1-67	COMPLETED 6/69
A.E. STALEY MANUFACTURING CO.	TREATMENT BY MUNICIPALITY WHEN FACILITIES AVAILABLE	12/69	CEASED OPERATION
UNIROYAL UNITED STATES RUBBER CO. (NOW UNIROYAL CHEMICAL DIV. UNIROYAL, INC.)			
CHEMICAL DIV. PLANT AREA #2	FACILITIES BEING DESIGNED [illegible]. EVALUATION OF ADDITIONAL NEEDS TO FOLLOW.		REVISED PLANS FOR COMBINED TREATMENT OF AREAS 1 AND 2. APPROVED [illegible]. UNDER CONSTRUCTION. EXPECT COMPLETION 1971.
CHEMICAL DIV. PLANT AREA #1	ADDITIONAL FACILITIES FOR SOLIDS, OXYGEN DEMANDING MATERIALS AND SOLIDS	GENERAL PLANS 1-1-68 DETAIL PLANS 12-1-68 CONSTRUCTION 12-1-69	
	[illegible] RIVER BASIN		
THE BALTIMORE & OHIO RAILROAD CO.	ADDITIONAL FACILITIES FOR REMOVAL OF OIL	PLANS 7-1-67 CONSTRUCTION 7-1-68	DETAIL PLANS RECEIVED 6/70 COMPLETION EXPECTED 12/70
[illegible] CORPORATION [illegible] DIVISION, [illegible] PLANT [illegible] INC. [illegible] DIVISION, [illegible] PLANT)	ADDITIONAL FACILITIES [illegible] [illegible]	PLANS 7-1-67 CONSTRUCTION 7-1-68	COMPLETED 2/69

Reproduced from best available copy.

TABLE II. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	REMARKS
		MAUMEE RIVER BASIN	
CAMPBELL SOUP COMPANY	ADDITIONAL REDUCTION OF SOLIDS AND OXYGEN DEMAND	DETAIL PLANS 1/68 CONSTRUCTION	COMPLETED 9/69
CENTRAL FOUNDRY DIVISION GMC DEFIANCE PLANT	ADDITIONAL SOLIDS REDUCTION	CONSTRUCTION 7-1-67	COMPLETED 7/68
CLEVITE CORPORATION HARRIS DIVISION - NAPOLEON PLANT (NOW GOULD INC., HARRIS DIV. NAPOLEON PLANT)	ADDITIONAL FACILITIES NEUTRALIZATION, REDUCTION OF METALS AND SOLIDS	PLANS 7-1-67 CONSTRUCTION 7-1-68	COMPLETED 9/68
EDGERTON METAL PRODUCTS, INC.	TREATMENT OF CHROME WASTES, NEUTRALIZATION, REDUCTION OF SOLIDS	CONSTRUCTION 7-1-67	COMPLETED
ELITE PLATING DIVISION DYNAVEST CORPORATION	REDUCTION OF METALS AND CYANIDE, NEUTRALIZATION	PLANS 7-1-67 CONSTRUCTION 7-1-68	REVISED DETAIL PLANS IN PREPARATION FOR PRE-TREATMENT AND CONNECTION TO MUNICIPAL SEWERS
HAYES INDUSTRIES, INC. DECORATIVE DIVISION (NOW HAYES-ALBION CORP., DECORATIVE DIV.)	ADDITIONAL FACILITIES FOR IMPROVED REDUCTION OF SOLIDS AND NEUTRALIZATION	COMPLETE 7-1-66	COMPLETED
INTERLAKE STEEL CORPORATION	ADDITIONAL REDUCTION OF SOLIDS	PLANS 5-1-68 CONSTRUCTION 2-1-69	COMPLETED
JOHNS-MANVILLE FIBER GLASS, INC. PLANT #3	FACILITIES FOR CLOSED RECYCLE SYSTEM UNDER CONSTRUCTION	COMPLETION 8-1-67	COMPLETED
JOHNS-MANVILLE FIBER GLASS, INC. WATERVILLE PLANT	ADDITIONAL FACILITIES FOR COMPLETE TREATMENT	COMPLETED 12-1-66	COMPLETED
LIBBY, McNEILL & LIBBY	ADDITIONAL FACILITIES FOR TREATMENT OF PEAK LOADS	PLANS 6-1-67 CONSTRUCTION 8-1-67	COMPLETED
NATIONAL REFINING COMPANY DIVISION OF ASHLAND OIL AND REFINING COMPANY	ADDITIONAL FACILITIES FOR OIL, SOLIDS AND OXYGEN DEMAND REDUCTION UNDER CONSTRUCTION	PLANS 2-1-66 CONSTRUCTION 6-1-67	COMPLETED
PEPSI-COLA BOTTLING COMPANY	ADDITIONAL FACILITIES FOR REDUCTION OF OXYGEN DEMAND	PLANS 3-1-67 CONSTRUCTION 1-1-68	CLOSED OPERATION

TABLE II. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	REMARKS
		MAUMEE RIVER BASIN - CON'T.	
REPUBLIC CREOSOTING COMPANY DIVISION OF REILLY TAR AND CHEMICAL CORPORATION	REDUCTION OF PHENOLICS AND OIL	PLANS 1-1-68 CONSTRUCTION 1-1-69	COMPLETED 5/69. TO CONNECT TO LIMA SEWERS BY 9/70
[illegible] DIVISION RUSCO INDUSTRIES, INC.	NEUTRALIZATION & SOLIDS REDUCTION	PLANS 9-1-67 CONSTRUCTION 8-1-68	WILL MOVE TOTAL OPERATION OUT OF STATE BY 8-1-70
O-K WAYNE TOOL COMPANY (DIV. DRESSER INDUSTRIES, INC. HAND TOOL DIV.)	NEUTRALIZATION & METALS REDUCTION	PLANS 3-1-67 CONSTRUCTION 1-1-68	NEGOTIATING CONTRACTS FOR CONNECTION TO CITY SEWERS
VISTRON CORPORATION [illegible] PLANT (FORMERLY SOHIO CHEM. CO.)	ADDITIONAL REDUCTION OF NITROGEN COMPOUNDS	IN-PLANT CONTROLS 1-1-68 RESEARCH STUDIES UNDERWAY	UNDER CONSTRUCTION. COMPLETION EXPECTED 1971.
SOHIO CHEMICAL COMPANY (DIV. VISTRON CORP. ACRYLONITRILE PLANT)	ADDITIONAL REDUCTION OF NITROGEN COMPOUNDS AND OXYGEN DEMAND	PLANS 1-1-68 CONSTRUCTION 1-1-69	NEW DISPOSAL WELL UNDER CONSTRUCTION. COMPLETION EXPECTED 1970
THE STANDARD OIL COMPANY	AERATED LAGOON FOR BIOLOGICAL TREATMENT	COMPLETED 2-1-67	COMPLETED
[illegible] & SONS, INC.	PROCESS CHANGE. EVALUATE EXISTING FACILITIES FOR PRESENT OPERATIONS	EVALUATION 8-1-67	COMPLETED. CHANGED OPERATION
T.E. [illegible] COMPANY OHIO DIVISION	ADDITIONAL REDUCTION OF METALS AND SOLIDS	PLANS 6-1-67 CONSTRUCTION 9-1-68	COMPLETED 9/68
		OTTAWA RIVER (TENMILE CR.) BASIN	
[illegible] CORPORATION [illegible] DIVISION	IMPROVEMENTS IN FACILITIES AND OPERATION	COMPLETED 12-1-66	COMPLETED 12/65
		[illegible] RIVER BASIN	
[illegible]	[illegible]	PLANS 1-1-69 CONSTRUCTION 1-1-69	DETAIL PLANS APPROVED 1/70. UNDER CONSTRUCTION. COMPLETION EXPECTED 1970.

TABLE III. - CONTINUED

ENTITY	TYPE OF IMPROVEMENTS	IMPLEMENTATION SCHEDULE (COMPLETION DATES)	STATUS
		PORTAGE RIVER BASIN - CON'T.	
SWIFT AND COMPANY (NOW SWIFT EDIBLE OIL CO. A DIV. OF SWIFT & CO.)	FACILITIES FOR REDUCTION OF OIL, COLOR AND OXYGEN DEMAND. ANTICIPATE CONNECTION TO MUNICIPAL SEWERS.	CONSTRUCTION 6-1-67	PRE-TREATMENT FACILITIES COMPLETED. SEWERS NOT YET AVAILABLE.
		SANDUSKY RIVER BASIN	
NORTHERN OHIO SUGAR COMPANY	ADDITIONAL REDUCTION OF OXYGEN DEMAND	PLANS 12-31-68 CONSTRUCTION 12-31-69	ADDITIONAL FACILITIES COMPLETED 9/69. NEGOTIATING FOR DISCHARGE TO MUNICIPAL SEWERS.
THE PIONEER RUBBER COMPANY PLANT NO. 2	FACILITIES FOR REDUCTION OF OXYGEN DEMAND	ANTICIPATE CONNECTION TO PROPOSED MUNICIPAL SEWERAGE	MUNICIPAL SEWERS NOW UNDER CONSTRUCTION. SCHEDULED DATE FOR COMPLETION 3/71.
		TRIBUTARY TO LAKE ERIE	
BECHTEL-McLAUGHLIN, INC.	FACILITIES FOR NEUTRALIZATION, CHROME AND SOLIDS REDUCTION	PLANS 2-1-67 CONSTRUCTION 2-1-68	BOARD ISSUED A CEASE & DESIST ORDER 2-10-70. GENERAL PLANS RECEIVED 4-27-70. DETAIL PLANS EXPECTED PRIOR TO 6-1-70.
DOEHLER-JARVIS DIVISION NATIONAL LEAD COMPANY TOLEDO PLANT #2	ADDITIONAL FACILITIES FOR REDUCTION OF METALS, SOLIDS AND CYANIDE	PLANS 6-1-67 CONSTRUCTION 6-1-68	COMPLETED 8/69
CENTRAL SOYA COMPANY BELLEVUE PLANT	ADDITIONAL FACILITIES FOR REDUCTION OF OIL	PLANS 6-1-67 CONSTRUCTION 6-1-68	PRE-TREATMENT FACILITIES UNDER CONSTRUCTION. CONNECTION TO SEWERS NOW UNDER CONSTRUCTION.
CLEVELAND METAL CLEANING COMPANY	FACILITIES FOR NEUTRALIZATION AND OIL AND SOLIDS REMOVAL	PLANS 9-1-67 CONSTRUCTION 7-1-68	UNDER CONSTRUCTION. COMPLETION EXPECTED 1970.
CORN PRODUCTS, INC. AMERICAN METALS CORP.	ADDITIONAL FACILITIES FOR TREATMENT OF CHROMIUM WASTE	PLANS 7-1-67 CONSTRUCTION 1-1-69	TREATMENT FACILITIES COMPLETED. WILL CONNECT TO SEWERS NOW UNDER CONSTRUCTION.
GENERAL ELECTRIC COMPANY BELLEVUE LAMP PLANT #2	TO BE [illegible] TRIBUTARY TO MUNICIPAL SYSTEM	CONSTRUCTION 2-1-69	WILL CONNECT TO MUNICIPAL SEWERS BY 9/70 NOW UNDER CONSTRUCTION

TABLE II. - CONTINUED

ENTITY	REMEDIAL PROGRAM	IMPLEMENTATION SCHEDULE (COMPLETION DATE)	REMARKS
		TRIBUTARY TO LAKE ERIE - CON'T.	
TERZEL CANNING COMPANY	ADDITIONAL FACILITIES FOR MORE POSITIVE CONTROL OF WASTES	CONSTRUCTION 7-1-67	COMPLETED 9/69
THE LAKE ERIE CANNING COMPANY	ADDITIONAL FACILITIES FOR REDUCTION OF OXYGEN DEMAND	PLANS 3-1-67 CONSTRUCTION 7-1-67	PRE-TREATMENT FACILITIES COMPLETED 7/67. COUNTY SEWER TO BE AVAILABLE SUMMER 1970.
LIBBEY-OWENS-FORD GLASS CO. EAST TOLEDO PLANT	ADDITIONAL FACILITIES FOR SOLIDS REDUCTION	PLANS 10-1-67 CONSTRUCTION 1-1-69	COMPLETED 1969.
NATIONAL AERONAUTICS & SPACE ADMIN. PLUM BROOK STATION (RESEARCH CENTER)	SECONDARY TREATMENT	CONSTRUCTION 12-1-67	COMPLETED
NORFOLK & WESTERN RAILROAD CO. BELLEVUE YARDS	FACILITIES FOR REMOVAL OF OILS AND SOLIDS	PLANS 6-1-67 CONSTRUCTION 6-1-68	UNDER CONSTRUCTION. EXPECT COMPLETION 1970.
THE STANDARD OIL COMPANY TOLEDO REFINERY	ADDITIONAL FACILITIES FOR REDUCTION OF OIL, SOLIDS, PHENOLS AND [illegible]	PLANS 1-1-68 CONSTRUCTION 12-31-69	COMPLETED 2/70
TOLEDO SCALE DIV. OF TOLEDO SCALE CORP. (NOW TOLEDO SCALE CO. DIV. OF THE RELIANCE ELECTRIC CO.)	FACILITIES FOR REDUCTION OF METALS, SOLIDS, AND OIL	PLANS 7-1-67 CONSTRUCTION 7-1-68	CONNECTED TO TOLEDO SEWERS 12/68
TRUE TEMPER CORPORATION	ADDITIONAL FACILITIES FOR REDUCTION OF SOLIDS AND OIL	PLANS 5/66	COMPLETED
		DIRECT TO LAKE ERIE	
THE CLEVELAND ELECTRIC ILLUMINATING CO.			
[illegible] PLANT	[illegible]	PLANS 12/67 CONSTRUCTION 12/69	[illegible] 1970.

TABLE II. - CONTINUED

ENTITY	ADDITIONAL REQUIREMENTS	APPROVED SCHEDULE (COMPLETION DATES)	REMARKS
		DIRECT TO LAKE ERIE - CON'T.	
THE CLEVELAND ELECTRIC ILLUMINATING CO. - CON'T.			
AVON PLANT	ADDITIONAL FACILITIES FOR REDUCTION OF SOLIDS	PLANS 7-1-67 CONSTRUCTION 7-1-68	NEW DRY FLY ASH FACILITIES FOR ALL ELEVEN EXISTING UNITS COMPLETED 8/69. FIVE LARGEST UNITS CONNECTED. OTHER SIX TO BE CONNECTED WITH SCHEDULED OUTAGES IN 1970. NEW #9 UNIT JUST COMPLETED. WILL PERMIT SCHEDULED OUTAGES.
LAKESHORE PLANT	ADDITIONAL FACILITIES FOR REDUCTION OF SOLIDS	PLANS 12/67 CONSTRUCTION 10/68	NEW DRY FLY ASH FACILITIES UNDER CONSTRUCTION. COMPLETION EXPECTED 9/70.
EASTLAKE GENERATING STATION	ADDITIONAL FACILITIES FOR REDUCTION OF SOLIDS	PLANS 7/67 CONSTRUCTION 8/69	NEW DRY FLY FACILITIES COMPLETED 9/69. 3 UNITS CONNECTED. 4TH UNIT TO BE CONNECTED WITH NEXT OUTAGE. FACILITIES FOR NEW 5TH UNIT UNDER DESIGN.
IRC FIBERS DIVISION MIDLAND-ROSS CORPORATION (NOW IRC FIBERS CO., A SUBSIDIARY OF AMERICAN CYANAMID CO.)	FACILITIES FOR NEUTRALIZATION AND REDUCTION OF ZINC AND SOLIDS	PLANS 2-1-67 CONSTRUCTION 1-1-69	SOME FACILITIES COMPLETED RESULTING IN SIGNIFICANT REDUCTION OF ZINC. STUDIES FOR ADDITIONAL FACILITIES UNDERWAY.
THE LUBRIZOL CORPORATION	ADDITIONAL FACILITIES FOR REDUCTION OF OXYGEN DEMAND	PLANS 3-1-67 CONSTRUCTION 12-1-67	COMPLETED
TRW, INC.	ADDITIONAL FACILITIES FOR NEUTRALIZATION AND REDUCTION OF METALS AND SOLIDS	PLANS 12-1-66 CONSTRUCTION 1-1-69	UNDER CONSTRUCTION. COMPLETION EXPECTED 6-1-70.
UNITED STATES GYPSUM COMPANY	FACILITIES FOR COMPLETE TREATMENT	PLANS 9-1-68 CONSTRUCTION 12-31-69	COMPLETED
UNITED STATES RUBBER COMPANY	COMPLETE FACILITIES	CONNECTED 7-15-66	CONNECTED

TABLE III. MUNICIPAL WATER POLLUTION CONTROL REQUIREMENTS IN ADDITION TO THOSE OF THE
LAKE ERIE ENFORCEMENT CONFERENCE
AS OF JUNE 1, 1970

ENTITY	REQUIREMENTS	COMPLETION SCHEDULES			REMARKS
		GENERAL PLANS	DETAIL PLANS	CONSTRUCTION	
		CHAGRIN RIVER BASIN			
CHAGRIN FALLS	PLANT IMPROVEMENTS AND SEWERS	9-15-69	9-15-70	12-15-71	
EASTLAKE	ADDITIONAL SEWERS AND CONNECT WILLOUGHBY-EASTLAKE PLANT		APPROVED	7-1-70	
		CUYAHOGA RIVER BASIN			
AKRON	ADVANCED WASTE TREATMENT	1-15-72	7-15-73	1-1-75	
BEDFORD	PLANT ENLARGEMENTS	APPROVED	11-15-69	12-15-71	
BEDFORD HEIGHTS	PLANT ENLARGEMENTS	APPROVED	2-15-69	9-15-70	
BRECKSVILLE	ADDITIONAL SEWERS AND ELIMINATE STORM WATER		1-15-70	1-15-75	
BROADVIEW HEIGHTS	NEW PLANT AND SEWERS		5-15-69	12-1-70	
BURTON	PLANT IMPROVEMENTS AND SEWERS	3-15-69	7-15-70	12-15-71	
CLEVELAND - SOUTHERLY	ADVANCED WASTE TREATMENT	1-15-72	7-15-73	1-1-75	
KENT	ADDITIONAL SEWERS AND ELIMINATE STORM WATER		6-15-70	12-15-70	
MAPLE HEIGHTS	1. CONNECT TO CLEVELAND - SOUTH. 2. [illegible] PLT.	12-15-69	APPROVED 7-15-70	6-15-70 1-1-72	PLAN TO CONNECT TO C.V.[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	
[illegible]	[illegible]		[illegible]	[illegible]	

TABLE III. - CONTINUED

ENTITY	IMPROVEMENTS	[illegible]	[illegible]	[illegible]	REMARKS
		CUYAHOGA RIVER BASIN - CON'T.			
RAVENNA	PLANT ENLARGEMENTS	3-1-69	3-15-70	1-15-72	
SEVEN HILLS	CONNECT TO CLEVELAND-SO.		12-15-69	7-15-72	
SOLON (CENTRAL AREA)	PLANT ENLARGEMENTS		APPROVED	6-1-70	
VALLEY VIEW	SEWERS AND CONNECT TO CLEVELAND-SO.	5-15-69	7-15-70	12-15-71	
SUMMIT COUNTY					
NORTHEAST S.D. #6	NEW PLANT TO REPLACE EXISTING FACILITIES	2-1-69	9-15-69	12-15-70	
NORTHEAST S.D. #15	PLANT ENLARGEMENTS	6-15-70	5-15-71	12-15-72	
		GRAND RIVER BASIN			
CHARDON	PLANT IMPROVEMENTS	6-15-69	7-1-70	12-1-71	
JEFFERSON	PLANT ENLARGEMENTS AND OTHER IMPROVEMENTS	2-15-69	6-15-70	12-15-71	
		MAUMEE RIVER BASIN			
ADA	ADVANCED WASTE TREATMENT	12-15-70			
ARCHBOLD	ADVANCED WASTE TREATMENT		APPROVED		INITIATE CONSTRUCTION 9-15-70
DELPHOS	ADVANCED WASTE TREATMENT	6-15-70			
FINDLAY	ADVANCED WASTE TREATMENT		APPROVED	4-15-70	UNDER CONSTRUCTION
GIBSONBURG	NEW PLANT	APPROVED	3-15-71		
GRAND RAPIDS	NEW PLANT	12-15-70			

TABLE III. - CONTINUED

ENTITY	REQUIREMENTS	COMPLETION SCHEDULES			REMARKS
		GENERAL PLANS	DETAIL PLANS	CONSTRUCTION	
		MAUMEE RIVER BASIN - CON'T.			
KALIDA	NEW PLANT	6-15-70			
LIMA	ADVANCED WASTE TREATMENT		5-15-70		PLANS IN PREPARATION
NEW KNOXVILLE	NEW PLANT	8-15-70			
OTTOVILLE	NEW PLANT	4-15-70			
VAN WERT	ADVANCED WASTE TREATMENT		3-15-70		
WAPAKONETA	ADVANCED WASTE TREATMENT		12-1-70	12-1-72	PLAN IN PREPARATION
		ROCKY RIVER BASIN			
BROOKPARK	PLANT ENLARGEMENTS	6-15-70	1-15-71	1-15-72	
LAKEWOOD	REDUCTION OF STORM WATER			12-15-72	PROGRAM UNDERWAY
MEDINA	PLANT ENLARGEMENTS		1-1-70	12-1-71	
MEDINA COUNTY S.D. #5	SEWERS AND NEW PLANT		APPROVED	1-1-71	

TABLE II. INDUSTRIAL WATER POLLUTION CONTROL REQUIREMENTS IN ADDITION TO THOSE OF THE LAKE ERIE ENFORCEMENT CONFERENCE AS OF JUNE 1, 1970

ENTITY	REQUIREMENTS	COMPLETION DATE	
		PLANS	CONSTRUCTION
	ASHTABULA RIVER BASIN		
CABOT TITANIA CORPORATION TITANIUM DIOXIDE PLANT	COMPLETE FACILITIES FOR REMOVAL OF SETTLEABLE SOLIDS (1)	-	7/70
CABOT TITANIA CORPORATION TITANIUM TETRACHLORIDE UNIT	INITIATE PROGRAM FOR REDUCTION OF SUSPENDED SOLIDS (1)	-	7/70
DETREX CHEMICAL INDUSTRIES, INC. CHLORINATED SOLVENTS DIVISION	SUBMIT PROPOSAL FOR OFF-SIDE DISPOSAL OF ACIDS	-	7/70
DIAMOND ALKALI COMPANY SEMI-WORKS	SUBMIT REPORT ON IMPROVED IN-PLANT CONTROLS TO REDUCE SPILLS (1)	-	
THE GENERAL TIRE AND RUBBER COMPANY CHEMICAL DIVISION	SUBMIT PLANS OF FACILITIES FOR ADEQUATE TREATMENT (1)	7/70	-
OLIN MATHIESON CHEMICAL CORPORATION TDI FACILITY	NONE (1)	-	-
REACTIVE METALS, INCORPORATED METALS REDUCTION PLANT	NONE (1)	-	7/70
REACTIVE METALS, INCORPORATED SODIUM AND CHLORINE PLANT	COMPLETE ADDITIONAL IMPROVEMENT IN THE REMOVAL OF SUSPENDED SOLIDS AND THE DISPOSAL OF EXCESSIVE CHLORIDES (1)	-	-
SHERWIN WILLIAMS CHEMICAL PLANT	CONTINUE PROGRAM FOR REDUCTION OF CHLORIDES AND TOTAL SOLIDS (1)	-	12/70
	BLACK RIVER BASIN		
U.S. STEEL CORPORATION	REDUCTION OF SOLIDS, PHENOL AND OTHER WASTES	5-31-71	12-31-71

1) INITIATE A STUDY OF THE FEASIBILITY OF COMBINED TERMINAL TREATMENT

TABLE II. - CONTINUED

ENTITY	REQUIREMENTS	COMPLETION DATE PLANS	 CONSTRUCTION
	CUYAHOGA RIVER BASIN		
ALSIDE HOME CORPORATION DIVISION OF ALSIDE, INCORPORATED	CONNECT TO MUD BROOK INTERCEPTOR. NOW UNDER CONSTRUCTION.	-	2-1-71
ASTORIA PLATING CORPORATION	CONNECT TO MUNICIPAL SEWERS	-	7-1-70
BEDFORD GEAR AND MACHINE PRODUCTS, INCORPORATED	REDUCTION OF OIL	5-15-70	8-1-70
CLEVELAND CAP SCREW COMPANY	ELIMINATE POSSIBILITY OF INTERMITTANT OVERFLOW	-	17-1-70
CONSOLIDATED FREIGHTWAYS	STUDIES UNDERWAY FOR IMPROVED TREATMENT	-	-
CORNELL QUALITY TOOLS	CONNECT TO COUNTY SEWERS	-	7-1-70
DIAMOND CRYSTAL SALT COMPANY	NONE	-	-
E.I. DUPONT DENEMOURS AND COMPANY, INCORPORATED INDUSTRIAL AND BIOCHEMICALS DEPARTMENT	ADDITIONAL FACILITIES FOR pH CONTROL AND REDUCTION OF ZINC. UNDER CONSTRUCTION.	-	9/70
HARSHAW CHEMICAL COMPANY	ADDITIONAL REDUCTION OF SOLIDS.	-	-
HYDRAULIC PRESS BRICK COMPANY	CONSTRUCT INDUSTRIAL WASTE TREATMENT FACILITIES	-	7-1-70
[illegible] PLASTIC CORPORATION	DETAIL PLANS SUBMITTED 5/70 FOR ADDITIONAL FACILITIES	-	-
THE [illegible]SON RUBBER COMPANY	ADDITIONAL FACILITIES UNDER CONSTRUCTION	-	5-1-70
JONES AND LAUGHLIN STEEL CORPORATION			
[illegible] PICKLING	REPORT AND GENERAL PLAN APPROVED. EXPECT COMPLETION OF FACILITIES TO TREAT ACID PICKLING RINSE WATERS BY 7/71.	-	-
[illegible]	[illegible] OF SOLIDS FROM BASIC OXYGEN FURNACE	-	10-31-70
[illegible] MILL	[illegible] OF SOLIDS AND OIL.	-	-
[illegible] PRODUCTS [illegible], INCORPORATED	[illegible] CONSTRUCTION. EXPECT COMPLETION [illegible].	12-1-69	12-1-69

TABLE [illegible] - CONTINUED

ENTITY	REQUIREMENTS	COMPLETION DATE PLANS	COMPLETION DATE CONSTRUCTION
	CUYAHOGA RIVER BASIN - CON'T.		
MIDDLEFIELD SWISS CHEESE CO-OP ASSOCIATION	CONSTRUCTION COMPLETED 11-1-69 OF ADDITIONAL FACILITIES	-	-
MODERN TOOL AND DIE COMPANY - PARMA	FACILITIES FOR REMOVAL OF SUSPENDED SOLIDS, OIL, COLOR AND TOXIC SUBSTANCES	7-1-70	9-1-70
MOHAWK RUBBER COMPANY	CONNECT WASTE TO MUNICIPAL SEWER. COMPANY ORDERED SHOW CAUSE HEARING FOR 6-9-70	-	12-1-69
OHIO EDISON COMPANY - GORGE PLANT	REDUCTION OF EFFECTS OF THERMAL LOAD	1-1-71	1-1-72
REPUBLIC STEEL CORPORATION			
CLEVELAND DISTRICT BLAST FURNACE	ADDITIONAL FACILITIES FOR SOLIDS REMOVAL FOR BLAST FURNACE #5 AND #6.	-	-
CLEVELAND DISTRICT BY-PRODUCT COKE	CONNECT TO MUNICIPAL SEWER.	-	-
TRODEX, INCORPORATED	INVESTIGATE POSSIBILITY OF CONNECTING TO MUNICIPAL SEWERS. OFFSITE DISPOSAL OF ALKALI WASTE AND SLUDGES.	-	-
SMALLWOOD PACKING COMPANY, INCORPORATED	IMPROVED REMOVAL OF SOLIDS	-	10-1-70
TECUMSEH CORRUGATED BOX CORPORATION WHITE MILL DIVISION	ADDITIONAL FACILITIES FOR SOLIDS AND BOD REDUCTION	11-1-70	-
WEATHER-TITE COMPANY	ADDITIONAL FACILITIES FOR PROCESS CHANGE	7-1-70	10-1-70
	GRAND RIVER BASIN		
OHIO CHEMICAL	REDUCTION OF DISSOLVED SOLIDS. DETAIL PLANS SUBMITTED.	12-1-69	12-1-70
DIAMOND SHAMROCK CHEMICAL	ADDITIONAL FACILITIES FOR REMOVAL OF SUSPENDED SOLIDS	-	11-1-70
[illegible] CHEMICAL	COMPLETING STUDIES CONCERNING COD AND CHLORIDE.	-	-

TABLE II. - CONTINUED

ENTITY	REQUIREMENTS	COMPLETION DATE	
		PLANS	CONSTRUCTION
	HURON RIVER BASIN		
CERTAIN-TEED PRODUCTS CORPORATION	ADDITIONAL FACILITIES PRIOR TO EXPANSION.	-	-
MIDWEST INDUSTRIES	ADDITIONAL FACILITIES FOR REDUCTION OF SUSPENDED SOLIDS. INITIATE CONSTRUCTION 7-1-70.	7-1-70	-
	MAUMEE RIVER BASIN		
BUCKEYE SUGARS, INCORPORATED	CONNECT TO MUNICIPAL SEWERS WHEN AUTHORIZED. EXPECT TO CONNECT EARLY 1971.	-	-
BUNDY FOODS, INCORPORATED	STUDY TO EVALUATE PROBLEM. REPORT 10-1-70	-	-
CAMPBELL SOUP COMPANY	NONE	-	-
CHASE BRASS AND COPPER COMPANY	REDUCTION OF OIL	7-1-70	9-1-70
[illegible] PACKING COMPANY, INCORPORATED	CONNECT TO MUNICIPAL SEWERS	-	11-1-70
COOPER TIRE AND RUBBER	SUBMIT PLANS AND A SCHEDULE FOR FURTHER [illegible]	-	-
[illegible] STEEL PICKLING COMPANY DIVISION OF [illegible] WIRE AND IRON COMPANY	SUBMIT PLAN FOR TREATMENT OR DISPOSAL OF WASTE PICKLE LIQUOR	-	-
[illegible] PLATING DIVISION [illegible]	CONNECT TO MUNICIPAL SEWER	-	7-1-70
[illegible] MOTOR COMPANY [illegible] PLANT	ADDITIONAL FACILITIES PARTIALLY COMPLETED 6/70. SUBMIT [illegible] FOR ADDITIONAL FACILITIES. REPORT 7-1-70.	-	-
[illegible]	[illegible]	-	-
[illegible]	[illegible]	[illegible]	[illegible]

TABLE II. - CONTINUED

ENTITY	REQUIREMENTS	COMPLETION DATE	
		PLANS	CONSTRUCTION
	MAUMEE RIVER BASIN - CON'T.		
JOHNS-MANVILLE FIBER GLASS, INCORPORATED WATERVILLE PLANT	FURTHER REQUIREMENTS TO BE ESTABLISHED 7/70	-	-
LIBBY, McNEILL AND LIBBY	ABANDON EXISTING FACILITIES AND CONSTRUCT NEW FACILITIES	2-1-71	8/71
OHIO DECORATIVE PRODUCTS, INCORPORATED	ADDITIONAL FACILITIES FOR CHROME REDUCTION, pH ADJUSTMENT AND SOLIDS REMOVAL.	6-1-70	12-1-70
PRIDE OF LIMA PROVISION COMPANY	UNDER ORDERS TO CONNECT TO COUNTY SEWERS	-	-
SOHIO CHEMICAL COMPANY	CONTINUE STUDY FOR REDUCTION OF CYANIDE AND BOD	-	-
	OTTAWA RIVER (TENMILE CRK) BASIN		
DANA CORPORATION - TOLEDO DIVISION	ADDITIONAL FACILITIES REQUIRED. STUDY UNDERWAY.	-	-
	PORTAGE RIVER BASIN		
THE GREAT ATLANTIC AND PACIFIC TEA COMPANY, INCORPORATED ANN PAGE DIVISION	ADDITIONAL FACILITIES	9-1-70	11-1-70
THE J. WELLER COMPANY	STUDY TO EVALUATE PROBLEM. REPORT 1-1-71.	-	-
	SANDUSKY RIVER BASIN		
FREEZER QUEEN FOODS, INCORPORATED	REDUCTION OF BOD, SOLIDS AND GREASE. COMPLETED	-	6-1-70
[illegible] PROVISION COMPANY	ADDITIONAL FACILITIES FOR REDUCTION OF BOD, SOLIDS AND GREASE	-	11-1-70
TIFFIN CUSTOM BUTCHERING, INCORPORATED	SUBMIT AGREEMENT AND INITIATE CONSTRUCTION 6-1-70 TO CONNECT TO MUNICIPAL SEWER	-	-

TABLE IX. - CONTINUED

ENTITY	REQUIREMENTS	COMPLETION DATE	
		PLANS	CONSTRUCTION
	TRIBUTARY TO LAKE ERIE		
CORN PRODUCTS, INCORPORATED	CONNECT TO MUNICIPAL SEWERS. NOW UNDER CONSTRUCTION.	-	-
FORD MOTOR COMPANY LORAIN ASSEMBLY PLANT	CONNECT TO MUNICIPAL SEWER WHEN AUTHORIZED	-	-
LIBBEY-OWENS-FORD GLASS COMPANY EAST TOLEDO PLANT	ADDITIONAL FACILITIES FOR SOLIDS AND OIL REDUCTION. NO SCHEDULE.	-	-
NEW DEPARTURE-HYATT GENERAL MOTORS CORPORATION	CONNECT TO MUNICIPAL SEWERS WHEN AUTHORIZED	-	-
PERMAGLASS, INCORPORATED	ADDITIONAL FACILITIES COMPLETED	-	10-1-70
PIKE TURKEY FARM	NEW FACILITIES UNDER CONSTRUCTION. EXPECTED COMPLETION 7/70.	-	-
SUN OIL COMPANY TOLEDO REFINERY	REDUCTION OF BOD, SOLIDS, OIL, AND PHENOL. COMPLETION EXPECTED 9/70. CONTINUE EVALUATION STUDIES.	-	12-1-70
WHIRLPOOL CORPORATION CLYDE DIVISION	ADDITIONAL FACILITIES FOR INDUSTRIAL WASTE FROM PROCESS CHANGES. INITIATE CONSTRUCTION 3-1-71.	3-1-71	-
	DIRECT TO LAKE ERIE		
UNION CARBIDE CORPORATION LINDE DIVISION	COMPLETE REDUCTION OF SUSPENDED SOLIDS	-	4/71

APPENDIX B

WATER POLLUTION CONTROL BOARD
OHIO DEPARTMENT OF HEALTH
COLUMBUS, OHIO

RESOLUTION ESTABLISHING AMENDED CRITERIA OF STREAM-WATER QUALITY FOR VARIOUS USES ADOPTED BY THE BOARD ON APRIL 14, 1970

WHEREAS, Section 6111.03, of the Ohio Revised Code, provides, in part, as follows:

> "The water pollution control board shall have power:
>
> (A) To develop programs for the prevention, control and abatement of new or existing pollution of the waters of the state; ...." and

WHEREAS, Primary indicators of stream-water quality are needed as guides for appraising the suitability of surface waters in Ohio for various uses; and

WHEREAS, The stream-water quality criteria for various uses and minimum conditions applicable to all waters adopted by the Board of June 14, 1966, have been amended by the Ohio River Valley Water Sanitation Commission; and

WHEREAS, The criteria adopted by the Board on October 10, 1967, have been further amended by the Ohio River Valley Water Sanitation Commission;

THEREFORE BE IT RESOLVED, That the following amended stream-water quality criteria for various uses, and minimum conditions applicable to all waters, and policies for protection of high quality waters and for water quality design flow, are hereby adopted in accordance with amendments of the Ohio River Valley Water Sanitation Commission, and the recommendations of the Federal Water Pollution Control Administration.

AND BE IT FURTHER RESOLVED, That the amended stream-water quality criteria for various uses, for minimum conditions, for protection of high quality waters, and, for water quality design flow, be made applicable to the following waters of the state:

1. Maumee, Tiffin, St. Joseph, and St. Marys River Basins;
2. Lake Erie & Interstate Waters thereof;
3. Great Miami, Whitewater, and Wabash River Basins;
4. Ashtabula River, Conneaut and Turkey Creeks;
5. Ohio River of Ohio-West Virginia and Ohio-Kentucky;
6. North Central Ohio Tributaries of Lake Erie;
7. Scioto River Basin;
8. Little Miami River Basin;
9. Rocky, Cuyahoga, Chagrin and Grand River Basins;
10. Muskingum River Basin;
11. Hocking River Basin.

MINIMUM CONDITIONS APPLICABLE TO ALL WATERS AT ALL PLACES AND AT ALL TIMES

1. Free from substances attributable to municipal, industrial or other discharges, or agricultural practices that will settle to form putrescent or otherwise objectionable sludge deposits.

2. Free from floating debris, oil, scum and other floating materials attributable to municipal, industrial or other discharges, or agricultural practices in amounts sufficient to be unsightly or deleterious.

3. Free from materials attributable to municipal, industrial or other discharges, or agricultural practices producing color, odor or other conditions in such degree as to create a nuisance.

4. Free from substances attributable to municipal, industrial or other discharges, or agricultural practices in concentrations or combinations which are toxic or harmful to human, animal, plant or aquatic life.

PROTECTION OF HIGH QUALITY WATERS

Waters whose existing quality is better than the established standards as of the date on which such standards become effective will be maintained at their existing high quality, pursuant to the Ohio water pollution control statutes, so as not to interfere with or become injurious to any assigned uses made of, or presently possible, in such waters. This will require that any industrial, public or private project or development which would constitute a new source of pollution or an increased source of pollution to high quality waters will be required, as part of the initial project design, to provide the most effective waste treatment available under existing technology. The Ohio Water Pollution Control Board will cooperate with other agencies of the state, agencies of other states, interstate agencies and the Federal Government in the enforcement of this policy.

WATER QUALITY DESIGN FLOW

Where applicable for the determination of treatment requirements the water quality design flow shall be the minimum seven consecutive day average that is exceeded in 90 percent of the years.

STREAM-QUALITY CRITERIA

FOR PUBLIC WATER SUPPLY

The following criteria are for evaluation of stream quality at the point at which water is withdrawn for treatment and distribution as a potable supply:

1. **Bacteria**: Coliform group not to exceed 5,000 per 100 ml as a monthly average value (either MPN or MF count); nor exceed this number in more than 20 percent of the samples examined during any month; nor exceed 20,000 per 100 ml in more than five percent of such samples.

2. **Threshold-odor Number**: Not to exceed 24 (at 60 deg. C.) as a daily average.

3. **Dissolved solids**: Not to exceed 500 mg/l as a monthly average value, nor exceed 750 mg/l at any time.

4. **Radioactivity**: Gross beta activity not to exceed 1,000 picocuries per liter (pCi/l), nor shall activity from dissolved strontium-90 exceed 10 pCi/l, nor shall activity from dissolved alpha emitters exceed 3 pCi/l.

5. **Chemical constituents**: Not to exceed the following specified concentrations at any time.

Constituent	Concentration (mg/l)
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium (hexavalent)	0.05
Cyanide	0.025
Fluoride	1.0
Lead	0.05
Selenium	0.01
Silver	0.05

FOR INDUSTRIAL WATER SUPPLY

The following criteria are applicable to stream water at the point at which the water is withdrawn for use (either with or without treatment) for industrial cooling and processing:

1. **Dissolved oxygen**: Not less than 2.0 mg/l as a daily-average value, nor less than 1.0 mg/l at any time.

2. **pH**: Not less than 5.0 nor greater than 9.0 at any time.

3. **Temperature**: Not to exceed 95 deg. F. at any time.

4. **Dissolved solids**: Not to exceed 750 mg/l as a monthly average value, nor exceed 1,000 mg/l at any time.

FOR AQUATIC LIFE A

The following criteria are for evaluation of conditions for the maintenance of a well-balanced, warm-water fish population. They are applicable at any point in the stream except for areas necessary for the admixture of waste effluents with stream water:

1. Dissolved oxygen: Not less than an average of 5.0 mg/l per calendar day and not less than 4.0 mg/l at any time.

2. pH:

   A. No values below 6.0 nor above 8.5.

   B. Daily fluctuations which exceed the range of pH 6.0 to pH 8.5 and are correlated with photosynthetic activity may be tolerated.

3. Temperature:

   A. No abnormal temperature changes that may affect aquatic life unless caused by natural conditions.

   B. The normal daily and seasonal temperature fluctuations that existed before the addition of heat due to other than natural causes shall be maintained.

   C. Maximum temperature rise at any time or place above natural temperatures shall not exceed 5 deg. F. In addition, the water temperature shall not exceed the maximum limits indicated in the following table.

WATERS	Maximum Temperature in Deg. F. During Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
All waters except Ohio River	50	50	60	70	80	90	90	90	90	78	70	57
Main Stem-Ohio River	50	50	60	70	80	87	89	89	87	78	70	57

4. Toxic substances: Not to exceed one-tenth of the 48-hour median tolerance limit, except that other limiting concentrations may be used in specific cases when justified on the basis of available evidence and approved by the appropriate regulatory agency.

FOR AQUATIC LIFE B

The following criteria are for evaluation of conditions for the maintenance of desirable biological growths and, in limited stretches of a stream, for permitting the passage of fish through the water, except for areas necessary for admixture of effluents with stream water:

1. Dissolved oxygen: Not less than 3.0 mg/l as a daily-average value, nor less than 2.0 mg/l at any time.

2. pH: Not less than 6.0 nor greater than 8.5 at any time.

3. Temperature: Not to exceed 95 deg. F. at any time.

4. Toxic substances: Not to exceed one-tenth of the 48-hour median tolerance limit, except that other limiting concentrations may be used in specific cases when justified on the basis of available evidence and approved by the appropriate regulatory agency.

FOR RECREATION

The following criterion is for evaluation of conditions at any point in waters designated to be used for recreational purposes, including such water-contact activities as swimming and water skiing:

Bacteria: The fecal coliform content (either MPN or MF count) not to exceed 200 per 100 ML as a monthly geometric mean based on not less than five samples per month; nor exceed 400 per 100 ML in more than ten percent of all samples taken during a month.

FOR AGRICULTURAL USE AND STOCK WATERING

The following criteria are applicable for the evaluation of stream quality at places where water is withdrawn for agricultural use or stock-watering purposes:

1. Free from substances attributable to municipal, industrial or other discharges, or agricultural practices that will settle to form putrescent or otherwise objectionable sludge deposits.

2. Free from floating debris, oil, scum and other floating materials attributable to municipal, industrial or other discharges, or agricultural practices in amounts sufficient to be unsightly or deleterious.

3. Free from materials attributable to municipal, industrial or other discharges, or agricultural practices producing color, odor or other conditions in such degree as to create a nuisance.

4. Free from substances attributable to municipal, industrial or other discharges or agricultural practices in concentrations or combinations which [illegible] toxic or harmful to human, animal, plant or aquatic life.

MR. STEIN: I think since we are going to have these workshops, possibly the conferees or other people could defer some specific comments on the material in the appendix to the time we have these workshops.

MR. EAGLE: I would just like to point out, Mr. Stein, we welcome these workshops, and we hope this will result in some substantial assistance from the Federal Government because we do have some laggards in Ohio -- not too many, but some -- that we do need some help with. And any assistance you can give with regard to these, we would appreciate very much.

MR. STEIN: I am happy to say that with all the Lake Erie States, I think particularly since we have had these series of conferences, generally speaking, we have problems, maybe some rough edges of State-Federal relations, but I think it is pretty fair to say we have been working practically as one staff for the past year or two. And you can be assured we will give you all the help possible.

MR. EAGLE: Thank you.

MR. STEIN: Are there any other comments or questions?

MR. VOGT: I have a question, Mr. Chairman.

George, I note that in a number of instances, you initiated, as you call it, building fees, imposed building fees, on some of your communities. And this particular technique, we have used in Michigan and found it to be rather effective in accelerating control programs, pollution control programs.

I am wondering what has been your experience so far in Ohio with these types of impositions.

MR. EAGLE: Very good results. In about 90 percent of the cases, it has solved the problem. Of course, we still have a number of them outstanding. I think we have some 25 or 30 outstanding at this time. We started this program about three years ago. To date more than 75 percent of them have gotten under way to the extent that the building fees could be lifted.

MR. VOGT: I see. That is interesting because, in other words, it assures the initiation and continuation of a positive program of pollution control.

MR. EAGLE: Of course, we do have on the other side, John, some city officials prevail on us to give them building fees because they don't want to see their municipality develop. They want to keep it just like it is.

MR. STEIN: Are there any other comments or questions?

(No response.)

Thank you very much, Mr. Eagle, for a very interesting contribution.

May we call on Pennsylvania?

STATEMENT OF WALTER A. LYON
DIRECTOR, BUREAU OF SANITARY ENGINEERING
PENNSYLVANIA DEPARTMENT OF HEALTH

MR. LYON: I will try not to go into any detail and make this very brief, Mr. Chairman.

Mr. Bellaman. our Regional Engineer, is passing out copies of our report.

I would like also permission to make as part of the record a statement by Mayor Louis J. Tullio of the city of Erie. And Mr. Bellaman has copies of that statement.

MR. STEIN: Both the statements will appear in the record as if read in their entirety without objection.

(The above-referred to statements follow in their entirety.)

by Walter A. Lyon

STATUS REPORT

Water Pollution Control in the Pennsylvania Portion of the Lake Erie Basin

June, 1970

Sanitary Water Board
Pennsylvania Department of Health

STATUS REPORT TO LAKE ERIE CONFEREES

by

Commonwealth of Pennsylvania
Department of Health

June 3, 1970

(1) Pursuant to adoption of the Lake Erie phosphorus removal plan adopted by the Sanitary Water Board on June 18, 1969, orders were issued to ten industries and municipalities requiring a substantial reduction in the amount of phosphorus discharged from their waste treatment facilities. Compliance with the orders will result in at least 80% reduction of phosphorus from municipal and industrial sources in the Pennsylvania portion of the Lake-Erie basin. At this time, six of the ten dischargers are either in compliance with the orders or are on schedule to achieve compliance by the July 1, 1972 overall deadline. Four of the municipalities have requested hearings. The municipalities that requested hearings are the Boroughs of Girard, North East, Lake City and Albion. The hearings have not yet been scheduled by our Legal Counsel. We hope to have these soon.

(2) The detection of significant concentrations of mercury in Lake Erie fish has had a deleterious effect on Pennsylvania's use of the lake's waters. The market for commercial fishes has been seriously affected and Governor Shafer has had to warn sport fishermen that concentrations of mercury exceeding FDA limits have been found in certain sport species and these should not be consumed. Mercury in Lake Erie represents a public health threat and is having an adverse economic effect on Pennsylvania.

Mercury analyses performed to date show detectable concentrations of mercury in all fishes taken from Pennsylvania waters. Concentrations varied with species and ranged from 0.04 parts per million to 1.43 parts per million. Only edible portions of fish were analyzed. Generally, the top predators such as walleye, smallmouth bass, white bass, and fresh water drum showed the highest concentrations of mercury. Smelt, perch, rock bass, carp, suckers and crappies showed lower concentrations of mercury in the flesh. Samples of several coho salmon taken from the lake showed levels of mercury less than 0.5 parts per million but ranged from 0.34 parts per million to 0.46 parts per million. The Pennsylvania Fish Commission is periodically sampling fish from Lake Erie. These fish are being analyzed by the Food and Drug Administration Laboratories.

Samplings of water and waste discharges for mercury were conducted during April and May. Bottom mud and fish samples from the Lake were also taken by the Pennsylvania Fish Commission for analysis. Mercury was not detected in the lake waters and in the bottom muds at the limits of detection of the tests. Mercury was detected in one waste water discharge, but re-sampling indicated that mercury was not present. Contamination of the sample bottles was possible since the first series of samples were not collected in properly cleaned containers.

As a result of our waste water survey, we are convinced that there are no significant sources of mercury being discharged to Lake Erie from Pennsylvania sources. We did learn that the Hammermill Paper Company used mercurials up to ten to fifteen years ago for slime control but discontinued the use at that time. We have sampled the bottom muds in the vicinity of the Hammermill outfall to determine if residual mercury is present in this area. We will continue a surveillance program of discharges to Lake Erie.

We recommend that action be taken by the conferees to insure that all discharges of mercury and other toxic materials to Lake Erie and its tributaries are halted.

(3) Attached are listings of the status of sewerage and industrial waste cases that have been considered by the Lake Erie Enforcement Conference. In addition to these cases, permits have been issued for several small sewage treatment plants to serve installations such as highway rest stops. These treatment plants meet the minimum requirements established by the conferees.

TABLE I

Sewerage Status
(June, 1970)

Name	Present Status - Comments
City of Erie	1. Sewage treatment plant expansion and improvements - Plans approved for expansion and improvements that include secondary treatment and phosphorus removal such that the effluent will contain no more than 1 mg/l phosphorus as P. Will treat Erie metropolitan plus Hammermill Paper Company wastes. If grant processing moves expeditiously should begin construction by October 1, 1970 and complete construction and begin operation by February 15, 1972. 2. Present treatment efficiency, untreated discharges through storm sewers - Treatment plant now providing secondary treatment with continuous disinfection with exception of excessive solids loss from final settling tanks during periods of peak flow. Interim actions to reduce these losses have been ordered and include tighter operation control. Recent surveys indicate that 80% of the untreated sewage being by-passed at storm sewer outlets has been diverted to the treatment plant. Expansion of the treatment plant, including hydraulic changes, is expected to achieve 100% abatement. At present, additional sewer extensions and new connections are prohibited. A hearing on this problem held on October 31, 1969 was adjudicated on May 15, 1970, and a compliance schedule must be submitted by August 15, 1970. Expansion of the Bay Front interceptor will ultimately be needed to serve future growth and reduce or eliminate overflows during storms. This project is being held up by design of the Bay Front highway. Sewer and highway design and construction will have to be coordinated.

Name	Present Status - Comments
North East Borough	Presently providing secondary treatment. Ordered August 1, 1969 to provide tertiary treatment including phosphorus removal. Have requested hearing before Sanitary Water Board on order. Hearing has not been scheduled by the office of Legal Counsel.
Girard Borough	Presently providing secondary treatment. Ordered August 1, 1969 to provide tertiary treatment plus phosphorus removal. Have requested hearing before the Sanitary Water Board on the order. Hearing has not been scheduled by the Office of Legal Counsel.
Albion Borough	Presently providing secondary treatment. Ordered August 1, 1969 to provide tertiary treatment plus phosphorus removal. Have requested hearing before the Sanitary Water Board on the order. Hearing has not been scheduled by the Office of Legal Counsel.
Lake City Borough	1. Ordered August 1, 1969 to provide tertiary treatment including phosphorus removal. Have requested hearing before the Sanitary Water Board on order. Hearing has not been scheduled by the Office of Legal Counsel. 2. Treatment plant is overloaded with the result that less than secondary treatment is being provided. Additional sewer extensions and connections are being prohibited.
Fairview School	Secondary treatment provided
Erie County Home	" " "
Greene Township Elementary School	" " "
Talarico Truck Stop	" " "
Howard Johnson Motor Stop	" " "
Penn State Behrend Center	" " "
Harborcreek Township School	" " "
Oakdale Corporation	" " "
Poplar White Thru-way	" " "
Terrace Restaurant	" " "
Mums Motel	" " "
Conneaut Valley Union Joint Elementary School	" " "
Kahkwa Club	" " "

Name	Present Status - Comments
Lakeshore Country Club	Secondary treatment provided
Presque Isle State Park	" " "
Travelers Rest	" " "
Fairview Township Industrial Development Corporation	" " "
Rondal Convalescent Home	" " "
Humble Oil and Refining Company	" " "
Summit School District	" " "
Interpace Corporation	" " "
Larry's Truck Stop	" " "
Wenner's Esso Station	" " "
Wilson Motel	" " "
Alpine Manor	Secondary treatment provided as of April 1, 1970.
Georgetown	Secondary treatment provided.
South Shore Service Company	Secondary treatment provided. Ordered August 1, 1969 to provide phosphorus removal. Feasibility study was completed but plans not submitted on schedule. Enforcement conference scheduled for May 29, 1970. If plans received by June 1, 1970 there should be no overall delay toward meeting compliance.

TABLE II

Industrial Status
(June, 1970)

Case Name	Present Status - Comments
Albro Packing Company	Providing adequate treatment including phosphorus control.
Hammermill Paper Company	1. A portion of total compliance will depend on the City of Erie sewage treatment expansion. 2. Delays due to strikes against certain supplies of material, together with construction worker labor problems have caused about two months delay in the pulping conversion process which will reduce the raw waste production to about 1/3 of the BOD load and 1/6 of the color load. Objections raised to deep water outfall for treated wastes may delay outfall construction until October 1, 1971. Pulping conversion and resulting waste reduction expected February 15, 1971 instead of December 15, 1970. Phosphorus control adequate.
Interlake Steel Company	Adequate treatment provided
Kaiser Aluminum and Chemical Corporation	" " "
Penelec Company	" " "
Ruberoid Company	" " "
Welch Grape Juice Company	Adequate treatment provided for organic wastes. Cooling water causing thermal pollution in Sixteen Mile Creek. Feasibility report due July 1, 1970.

Case Name	Present Status - Comments
J. McCormick Construction Company	Adequate Treatment Provided
Nickel Plate Sand and Gravel	" " "
Erie Ceramics	" " "
Erie Brewing Company	" " "
International Pipe and Ceramics Corporation	" " "
Parker White Metal	Adequate treatment installed as of December 9, 1969.
Gunnison Brothers Tannery	Present treatment less than secondary. Tertiary treatment and adequate phosphorus control designed after research and development project. Inability to obtain necessary rights-of-way has required redesign and relocation of the treatment facility. Now to begin construction by August 1, 1970 and begin operation by October 15, 1970.
General Electric Company	Phosphorus control is adequate. Ordered to provide treatment of oil bearing wastes. Contracts awarded May 1, 1970. Strikes caused 3½ months delay. Partial completion and operation now expected by December 30, 1970 with total completion and operation by April 30, 1971.
American Sterilizer Company	Adequate Treatment Provided
Ervite Corporation	" " "
W. Ridge Gravel	" " "
Erie Reduction	Connected to City of Erie.

WHAT THE CITY OF ERIE, PENNSYLVANIA HAS DONE AND IS DOING TO ABATE POLLUTION

*** INTO LAKE ERIE ***

BY MAYOR LOUIS J. TULLIO, CITY OF ERIE, PENNSYLVANIA

THE CITY OF ERIE'S PRESENT PLANT WAS CONSTRUCTED IN 1954 UNDER PERMIT FROM THE PENNSYLVANIA DEPARTMENT OF HEALTH AND AT THAT TIME HAD AN EFFLUENT THAT MET OR EXCEEDED THE DEGREE OF TREATMENT REQUIRED FOR DISCHARGE INTO LAKE ERIE.

THE PLANT CLASSIFIED AS INTERMEDIATE TREATMENT IS CAPABLE OF TREATING 45 MILLION GALLONS PER DAY. THE AREA SERVED BY THE PLANT IS METROPOLITAN IN SCOPE SERVING NOT ONLY THE CITY OF ERIE BUT ALSO THE BOROUGH OF WESLEYVILLE AND THE TOWNSHIPS OF LAWRENCE PARK, MILLCREEK AND HARBORCREEK.

THE ORIGINAL PERMIT CALLED FOR CHLORINATION OF THE EFFLUENT ONLY DURING THE BATHING SEASON. IN APPROXIMATELY 1963 THIS PERMIT WAS AMENDED TO CALL FOR YEAR AROUND CHLORINATION. THE CITY HAS COMPLIED WITH THIS ORDER SINCE IT WAS ISSUED.

IN 1965, TO ELIMINATE INDUSTRIAL WASTE DISCHARGE FROM THE STORM SEWER SYSTEM AND TO CONTROL THESE DISCHARGES IN THE SANITARY SEWER SYSTEM THAT WERE THREATENING THE SEWERAGE PLANT WITH UPSETS, THE CITY THROUGH THE COOPERATION OF THE MANUFACTURERS ASSOCIATION HAD MADE AN INDUSTRIAL WASTE SURVEY OF THE CITY TO DETERMINE THE QUALITY, QUANTITY AND LOCATION OF INDUSTRIAL DISCHARGES. THIS LED TO PASSAGE OF AN INDUSTRIAL WASTE ORDINANCE IN 1966. THIS ORDINANCE CONTROLS WHAT CAN BE DISCHARGED INTO THE SYSTEM AND WHAT REQUIRES PRE-TREATMENT BEFORE IT IS DISCHARGED. DURING 1966 AND 1967 INDUSTRY COMPLIED WITH THESE REGULATIONS. PERIODIC CHECKS SHOW THAT COMPLIANCE WITH THIS ORDINANCE BY INDUSTRY HAS BEEN GOOD.

WITH THE CHANGE IN THE STANDARDS FOR DISCHARGE INTO LAKE ERIE, THE CITY, THROUGH ITS SEWER AUTHORITY, WAS ORDERED TO UPGRADE ITS DEGREE OF TREATMENT.

PRELIMINARY DESIGN WAS UNDERWAY WHEN WE WERE APPROACHED BY THE HAMMERMILL PAPER COMPANY TO CONSIDER THE POSSIBILITY OF COMBINED TREATMENT OF THEIR INDUSTRIAL WASTE AND OUR MUNICIPAL WASTE. THIS WAS AGREED AND PILOT PLANT AND BENCH STUDIES WERE CONDUCTED TO DETERMINE THE DESIGN PARAMETERS AND THE FEASIBILITY OF COMBINED TREATMENT. CONCLUSIONS OF THIS STUDY INDICATED THAT COMBINED TREATMENT WAS FEASIBLE BOTH TECHNICALLY AND ECONOMICALLY. AS A RESULT OF THIS AN AGREEMENT WAS NEGOTIATED BETWEEN THE CITY, THE SEWER AUTHORITY AND THE HAMMERMILL PAPER COMPANY TO SHARE IN THE COST OF CONSTRUCTION, MAINTENANCE AND OPERATION OF THE NEW EXPANDED PLANT.

THE EXPANDED PLANT IS NOW UNDER ENGINEERING DESIGN. PRELIMINARY PLANS HAVE BEEN SUBMITTED TO THE STATE. THE CONSULTING ENGINEERS ARE WORKING TOWARDS A FALL DEADLINE FOR COMPLETED PLANS SO THAT THIS NEW PLANT CAN BE PUT OUT TO BIDS AND CONSTRUCTION STARTED THIS YEAR. THE EXPANDED PLANT WILL PROVIDE FOR COMPLETE TREATMENT PLUS PHOSPHATE REMOVAL IN COMPLIANCE WITH THE STATE'S ORDER. PRELIMINARY COST ESTIMATES FOR THIS PLANT ARE APPROXIMATELY $12,000,000 FOR CONSTRUCTION WITH AN ADDITIONAL $600,000 TO BE REQUIRED ANNUALLY FOR CHEMICALS TO TREAT THE PHOSPHATES.

COMBINED SEWERS:

THE OLDER PART OF THE CITY IS SERVICED BY COMBINED SEWERS. THIS WAS STANDARD PRACTICE UNTIL ABOUT 1930. ALL CONSTRUCTION AFTER THAT TIME WAS SEPARATE SYSTEMS.

THE CITY HAS BEGUN A PROGRAM TO SEPARATE ITS COMBINED SEWER SYSTEM IN THE PAST FEW YEARS. EXTENSIVE CONTRACTS HAVE BEEN LET, ESPECIALLY IN THE DOWNTOWN AREA TO ACCOMPLISH THIS. DOLLAR VOLUME FOR THIS WORK HAS EXCEEDED $2,000,000 IN THE PAST FOUR YEARS WITH AN ADDITIONAL $400,000 UNDER CONTRACT AT THIS TIME.

ERIE WILL CONTINUE WITH THIS PROGRAM OF SEPARATION AS FUNDS ARE MADE AVAILABLE.

SANITARY SEWERS:

THE CITY HAS PROVIDED SANITARY SEWERS TO ALL PARTS OF THE CITY. IT HAS ALWAYS BEEN THE ADMINISTRATION POLICY TO EXTEND THESE SERVICES AS PROMPTLY AS POSSIBLE FOLLOWING A REQUEST. AT PRESENT OVER 95% OF THE AREA OF THE CITY IS SERVICED BY SEWERS. THIS PROVIDES SERVICE TO ALMOST 100% OF THE POPULATION. THE ONLY AREAS REMAINING TO BE SERVICED ARE THOSE NOT YET DEVELOPED AND CERTAIN PORTIONS OF THE BAY FRONT.

THE CITY BECAUSE OF ITS TERRAIN DOES NOT REQUIRE MANY LIFT STATIONS. THE CITY HAS AT PRESENT FIVE, THREE OF THESE WERE CONSTRUCTED WITHIN THE PAST FOUR YEARS AT A COST IN EXCESS OF $2,000,000. THIS YEARS CAPITAL IMPROVEMENTS BUDGET PROVIDES $250,000 TO CONSTRUCT ANOTHER LIFT STATION TO SERVICE THE BAY FRONT AREA.

THE BAY FRONT AREA OF THE CITY IS SITUATED BELOW THE INTERCEPTOR SEWER, SO ALL OF THIS AREA MUST BE SERVICED WITH LIFT STATIONS. IN 1966 THE CITY HAD THEIR CONSULTANTS PREPARE PRELIMINARY PLANS FOR THIS AREA. PLANS CALL FOR FIVE LIFT STATIONS IN THIS AREA. TWO OF THESE WERE BUILT WITHIN THE PAST TWO YEARS WITH ANOTHER SCHEDULED FOR CONSTRUCTION IN THIS CALENDAR YEAR. THIS SHOULD COVER THE DEVELOPED AREAS, THE REMAINDER WILL BE CONSTRUCTED AS DEVELOPMENT TAKES PLACE.

THE CITY ALSO HAS PLANS TO CONSTRUCT LIFT STATIONS AT ITS WEST SIDE WATER PLANT TO PUMP THE WASTE WATER BACK INTO THE SEWER SYSTEM RATHER THAN INTO THE BAY.

AS A RESULT OF ENCLOSING THE CREEKS AND RUNS IN THE CITY, MANY SANITARY SEWERS HAD TO BE SIPHONED UNDER THE STORM SEWERS. TO INSURE NO FLOODING OF BASEMENTS, OVERFLOWS WERE REQUIRED TO BE CONSTRUCTED AT THESE SIPHON LOCATIONS.

IN THE PAST MANY OF THESE SIPHONS BECAME CLOGGED AND OVERFLOWED INTO THE STORM SEWERS. TO REDUCE THIS TO A MINIMUM WE HAVE INSTITUTED A PROGRAM OF BI-WEEKLY INPSECTIONS OF THESE SIPHONS AND CLEANING WHEN REQUIRED. THIS HAS GREATLY REDUCED THE OVERFLOWS FROM THIS SOURCE.

DURING THE PERIOD OF CONSTRUCTION OF COMBINED SEWERS MANY OVERFLOWS HAD TO BE CONSTRUCTED TO DIVERT HEAVY COMBINED FLOWS FROM THE TREATMENT PLANT. SINCE THE PLANT HAS HAD ADDED CAPACITY MANY OF THESE HAVE BEEN ABANDONED OR PLUGGED. OTHERS STILL EXIST, WE ARE WORKING ON THIS PROBLEM AND THROUGH THE COMBINATION OF SEPARATING THE COMBINED SEWERS AND ADDITIONAL CAPACITY AT THE PLANT SITE, WE HOPE TO SOLVE THIS PROBLEM.

THE MOST IMPORTANT PROBLEM WE HAVE NOW IS WITH OUR OLDER SEWER SYSTEM. MANY ILLEGAL CONNECTIONS EXIST AND SOME CROSS CONNECTIONS MUST BE THERE. WE HAVE FOUND MANY OF THESE AND CORRECTED THEM, THEREBY REDUCING THE FLOW TO THE BAY CONSIDERABLY. WE ARE WORKING DILIGENTLY TO CORRECT THIS BUT IT IS A TIME CONSUMING JOB, REQUIRING SEARCHING OLD RECORDS, DYE TESTING AND LOCATION STUDIES. WE WILL CONTINUE TO PURSUE THIS UNTIL ALL LOCATIONS ARE FOUND AND CORRECTED.

WE BELIEVE THAT WE HAVE BEEN PROGRESSIVE IN OUR FIGHT TO ABATE THE POLLUTION OF LAKE ERIE AND WILL PLACE OUR RECORD OF ACHIEVEMENT AGAINST ANY ALONG THE LAKE. WE WILL CONTINUE WITH OUR PLANS AND WILL NOT REST UNTIL ALL SOURCES OF POLLUTION INTO THE LAKE FROM ERIE ARE ABATED.

MR. LYON: I also understand that the county commissioners of the County of Erie and the County Health Department in Erie intend to submit written statements at a later date.

MR. STEIN: What later date? To this conference?

MR. LYON: I think to this conference.

MR. STEIN: I will keep the record open for a week.

MR. LYON: Fine. We will advise them accordingly. They may already be in the mail.

Our report covers essentially two areas. And I will not read our report. One is the mercury problem.

Summarizing briefly, we have monitored our discharges and found no consequential mercury discharges anywhere in Pennsylvania. We have monitored our waters and have not found anything serious in the way of mercury.

We have found that some of the fish that were collected in Pennsylvania did have mercury concentrations in excess of the limits, and our Governor has advised sportsmen to not eat certain types of fish. And this is also covered in our report.

And we are naturally very deeply concerned about this mercury problem, and I hope will be talking about that.

MR. STEIN: You don't mean other people can eat the fish other than the sportsmen?

MR. LYON: No. We are talking about the fish that the sportsmen collect.

We are in favor of sportsmen having mercury-free fish, Mr. Chairman.

In connection with our municipal and industrial program, let me briefly summarize that all but two minor discharges in Pennsylvania are providing secondary treatment. We have 32 sources of sewage -- municipal and private institutions.

Four of our smaller municipalities have requested hearings before our Board in connection with the phosphate reduction orders. And we hope to have these scheduled soon.

The city of Erie is approximately 14 months behind schedule in the completion of its program for phosphate removal. And this is associated with the Hammermill discharge because the city of Erie has agreed to a significant portion of the Hammermill wastes. They in themselves have helped reduce the phosphates because they will demand phosphates. The delay was caused because it was necessary to change the Hammermill process to allow the city of Erie to take those wastes.

In connection with page 3 of my report, the South Shore Service Company which is a very small sewage source indicates that the Enforcement Conference is scheduled for May 29. That should be changed to June 5.

And the last sentence, beginning with "if plans" should be struck from that portion of the report.

We have 16 industrial waste discharges. Three of them are behind schedule, one for two months, one for seven months, and the other for three and one-half months. Otherwise, our industrial program is in good shape.

I would like to mention that even though the city of Erie sewage treatment plant will not go into operation until February 15, 1972, the wastes from the Hammermill Paper Company will in fact be reduced very significantly when their change in process goes into effect on or about February of 1971. Their BOD loads will be reduced by about two-thirds and their coli load will be reduced about 80 percent. So that in itself will be a very major reduction in industrial waste to Lake Erie and Pennsylvania.

In connection with Mr. Harlow's report, I think the additions I indicated are due to the passage of time perhaps since this information was submitted. I would like to, for example, refer to page 2 of the municipal report.

Under Erie there should be an indication that an adjudication has been issued as a result of the Bay Point sewer problem requiring abatement by 5/15/[illegible]

And the record should also show, and I would request that these changes be made in Mr. Harlow's report if he agrees, that an order stopping all additional sewer extensions and connections has been issued.

And I might also mention that the city of Erie has reduced its discharge from this Bay Point sewer from about 10 to 15 million gallons per day to approximately 3 to 5 million.

Similarly, in connection with Lake City, sewer connections are being prohibited and the permit is being suspended for failure to meet a compliance schedule. And an order will be issued to expand the sewage plant which appears to be overloaded.

In connection with Alpine Manor, the record should show that secondary treatment was provided as of 4/1/1970. Mr. Harlow's report says no schedule.

Switching over to the industrial waste portion of Mr. Harlow's report, page F-3, General Electric, the report should show that a permit was issued in March 1970 and construction will be completed and operation begun by

4/30/71.

In connection with Gunnison Brothers, the report should show that the construction will be completed and operation will be begun by October 15, 1970.

And in connection with the Hammermill Paper Company, Mr. Harlow's report should show that the pumping conversion and separate discharge of the diffuser system for the beach plant effluent should be completed by February 15 1971. And that will indicate the very significant reduction in wastes from that company at that time.

And unless there are questions, that completes my report.

MR. STEIN: Are there any comments or questions?

(No response.)

I don't want to necessarily get into detail on this, but I just want to spotlight this. In your report, you have North East Borough, Girard Borough, and Albion Borough, Lake City Borough. And presumably your Sanitary Water Board has taken action, but your Office of Legal Counsel has not scheduled hearings. And these are removable necessarily now, and they are in violation.

MR. LYON: Well, they are not now in violation until the hearings are held and adjudicated. We are asking our Office of Legal Counsel to schedule these hearings as soon as possible.

MR. STEIN: When I talk about violation, I mean of the schedules received at this conference.

MR. LYON: That's correct.

MR. STEIN: And then I think we have one more that maybe we don't see the light at the end of the tunnel -- Welch Grape Juice Company. The thing we are looking for is just the feasibility report. We don't have a commitment yet that they are going to clean up.

MR. LYON: No, my report says that adequate treatment is provided.

Are you looking on industrial wastes?

MR. STEIN: Table II. It says, "Adequate treatment provided for organic wastes. Cooling water causing thermal pollution. Feasibility report due."

MR. LYON: Yes, that is correct. I will ask Mr. Bellaman to comment on that.

MR. STEIN: Well, we can wait.

MR. BELLAMAN: We have received a schedule, but I don't recall offhand what the schedule calls for.

MR. STEIN: I think my primary point is to spotlight these so when we go to the workshops, we can get in on these.

There is one other one, and I hope we are over the hump, because I think that, Walter, long before you went to Pennsylvania, we were always dealing with the Hammermill Paper Company. Do you think that Hammermill is completely on its way now or do we still have some loose ends that we are going to have to tie up before we can write that one off and say they provide adequate treatment?

MR. LYON: I think Hammermill is completely on its way. There is one loose end that the company cannot control. They have requested a permit from the Corps for an outfall to handle its beach plant wastes, and we have issued a permit for that discharge. We think it will be completely adequate. However, the Corps has so far not issued its permit. We hope they will. If they don't issue that permit soon, there is going to be a delay.

MR. STEIN: Does the Corps have some comments on that?

MR. HARLOW: Yes. The Corps has asked us for comments, and we have provided the information to the Corps. But the Corps has not released the permit yet.

MR. STEIN: Are we in favor of the permit or not?

MR. HARLOW: We are in favor of issuing the permit in connection with meeting the requirements of the Sanitary Water Board.

MR. STEIN: Thank you.

Are there any other comments or questions?

(No response.)

If not, thank you very much, Mr. Lyon. And I want to congratulate you on the program, particularly on solving this Hammermill Paper Mill case because I almost dispaired that we would ever clean that up in our careers. But I guess we are on our way.

May we call on Indiana?

STATEMENT OF PERRY MILLER
INDIANA STREAM POLLUTION CONTROL BOARD

MR. MILLER: Mr. Chairman, conferees, ladies and gentlemen, my name is Perry Miller. And I am representing the Indiana Stream Pollution Control Board.

In the introduction to this report, we have indicated that we have contacted all of the industries in the Lake Erie Basin, and there are not any of these that are using mercury compounds.

Also, Indiana has initiated a pesticide monitoring program. We received a grant of approximately $40,000 to institute such a program in the Lake Michigan Basin. We have expanded this and are doing pesticide monitoring in the Lake Erie Basin as well as the Lake Michigan Basin.

All Indiana municipalities in the Lake Erie Basin with recognized sewer systems have secondary-type treatment facilities. In compliance with Indiana's Mandatory Certification Act, all municipal wastewater treatment facilities in the basin have a certified operator in responsible charge of the facilities. This, plus routine surveillance by representatives of the Stream Pollution Control Board, has improved operation and maintenance activities.

The City of Fort Wayne is continuing the planning and construction of major improvements to its combined sewer system to provide separation and/or treatment of combined sewer overflows. A holding lagoon is under construction across the river from the treatment plant for studies on effectiveness in reducing the pollution from sewer overflows and primary effluent bypassing during runoff from rainfall. A storm sewer separation project is under construction in Glenwood Park and an inner city storm relief plan is proposed if HUD funds are available.

The Maumee River plant operated by Diversified Utilities, a private utility, is still operating under overloaded conditions. An order of this Board requires the utility to expand its treatment facilities (as provided by the Federal Court) and to connect to the Fort Wayne sewer system by September 1, 1970. In addition, at least 80 percent phosphorus removal is to be provided not later than December 31,

1972. In the interim, requests for additional connections to the sewer system serving this area are not permitted.

Effluent Chlorination

The Board's plan of implementation adopted in 1967 required the municipalities of Avilla, Berne, Butler, Fort Wayne, Garrett, and Waterloo to provide effluent chlorination facilities by the end of 1968. Auburn, Decatur, Garrett Monroeville, and Waterloo and Diversified Utilities, Inc., are providing effluent chlorination. Avilla and Fort Wayne have chlorination facilities under construction and Butler is expected to start construction of plant improvements, including chlorination, in the next few weeks. New Haven's project for plant improvements including chlorination and phosphorus removal has been delayed by litigation against the bond sale; however, the city attorney has advised that he expects the project to proceed in the near future. Berne and Garrett do not have an effluent chlorination project under way.

Phosphorus Removal

To comply with the recommendations of the Lake Erie conference for 80 percent reduction in phosphorus in wastewater, the Board determined that all communities above 2,000 would be required to install phosphorus removal facilities before the end of 1972 capable of reducing phosphorus contributions by 80 percent. The municipalities of Auburn,

Perry Miller

Berne; Butler; Decatur; Diversified Utilities, Inc., Fort Wayne; Garrett; and New Haven were notified of this requirement during April 1969. As mentioned in the preceding paragraph, Butler and New Haven have projects approved, which include phosphorus removal, which should go to construction in the near future. The pilot plant studies on phosphorus removal by the City of Fort Wayne are expected to start in June 1970. Berne and Decatur have grant applications on file for projects which include phosphorus removal.

Of the 21 industries in the basin, 17 have adequate waste control facilities and four need additional treatment facilities. Of the four industries, Kitchen Quip, Inc., Waterloo, and General Plating and Engineering Company, Fort Wayne, do not have adequate control programs in progress.

There is a list of 17 of the adequate industries in the report.

And it is also noted that Auburn Tankage Company, Auburn, was closed in 1969.

A status report on the five industries listed as inadequate at the last status report in June 1969 is as follows:

Franke Plating Works, Inc., Fort Wayne

Construction on cyanide and chromium wastewater treatment facilities was started during March 1969. Completion was scheduled for the fall of 1969; however, because of late start of construction and equipment delivery, the facilities were not completed on schedule. All equipment has been delivered and final installation is being made and should be completed by June 15, 1970.

International Harvester Company, Fort Wayne

The company has completed all pollution control work with the exception of improved sewage disposal for a warehouse and packaging building located in the southeast area of the plant. The operation utilizes 290 employees and the waste is treated by a septic tank-absorption system. Only during extremely high soil moisture periods does any of the waste reach the receiving stream.

By September 1970, the level of employees should drop to 100 which will improve the capability of the system. Construction is proceeding on a sewer (by a sewer utility) which will enable discharge of this waste to the Fort Wayne sewerage system. Construction on the sewer by the utility was started during the spring of 1968. Construction was stopped during the summer of 1968 because of court action filed by a property owner concerning connection charges and delayed again during late 1968 and early 1969 because of financial difficulty brought on by the delay. Construction was restarted during March 1969.

MR. STEIN: When was that to be completed, Mr. Miller?

MR. MILLER: I really do not have a completion date, but I would expect it sometime later this year.

MR. STEIN: I wonder if as soon as you get that, we could have it to complete the record.

MR. MILLER: Yes, sir, we will supply this.

(The above-mentioned information follows.)

595a

[redacted]43 7/6
[illegible]

STATE of INDIANA

INDIANAPOLIS 46206

STREAM POLLUTION CONTROL BOARD

1330 West Michigan Street
633-4420

June 29, 1970

Mr. Murray Stein
Assistant Commissioner
  for Enforcement
Federal Water Quality Administration
Department of the Interior
Washington, D. C.   20242

Dear Mr. Stein:

Re: Conference on Lake Erie
and its Tributaries

At the reconvening of the Conference on Lake Erie and its Tributaries in Detroit on June 3 and 4, you requested information about the completion date for the sewer to serve the International Harvester Company in Fort Wayne.

American Suburban Utilities advised us on June 12 that this sewer should be completed in the International Harvester area by the Fall of 1970 and certainly before December 31, 1970.

In reviewing the report that was presented on behalf of the Stream Pollution Control Board in Detroit, there is a correction that should be made on Page 2 under Effluent Chlorination. The City of Garrett is providing effluent chlorination and, therefore, should be added in the second sentence as one of the communities chlorinating their plant effluent. The last sentence of this section should be corrected to show that the City of Berne does not have an effluent chlorination project underway.

Should you have any questions concerning the above please contact us.

Very truly yours,

B. A. Poole
Technical Secretary

PEMiller/se

Perry Miller

Parrot Packing Company, Fort Wayne

Construction of a sewer was completed on August 12, 1969, that allowed all the waste to be conveyed to the Fort Wayne sewerage system for treatment. Adequate control is being provided.

General Plating and Engineering Company, Fort Wayne

The company started construction of cyanide and chromium wastewater treatment facilities during the fall of 1968. Progress on the construction was poor because the owner insisted on doing a large part of the installation. During the summer of 1969, the company abandoned much of the work accomplished and began installation of anotner method of treatment. Attempts to obtain revised plans were futile and enforcement action was initiated in November 1969. A hearing was held on February 4, 1970, concerning pollution of the receiving stream. The recommended findings of fact have not been issued, but should be available in the near future. The staff plans to recommend to the hearing officer that plans and specifications be submitted by October 1, 1970, and waste treatment facilities be completed by December 1, 1971. The company recently employed an equipment company to complete plans for waste treatment facilities. If corrective action is not taken, the matter will be referred to the Attorney General as soon as practicable.

Kitchen Quip, Inc., Waterloo

Because of above-normal streamflow during 1969 and the spring of 1970, the staff has been unable to obtain sufficient evidence for the Board to proceed with new enforcement action. The Board's order of June 18, 1968, was overruled by the Lagrange County Circuit Court. This plant will be under surveillance during low flow periods to determine if water quality standards are violated.

MR. STEIN: Thank you.

Are there any comments or questions?

(No response.)

I just have one comment that I am raising as a question. I notice Kitchen Quip has been hanging around for awhile, and I recognize the problems. I raise the question, and I think we want to work this out mostly with you people in Indiana, whether you want to go with the State action or whether 180-day Federal action would be appropriate or whether we should proceed on both fronts with Kitchen Quip. I think we should try to remove that name from the list sometime.

MR. MILLER: I would agree with you. It should be removed from the list. And if you want my comment, I would say I would be in favor of every action we can have to get this removed.

MR. POOLE: It is the only case we have ever lost in court.

MR. STEIN: I know. And I think in that, we might be able to help by using both. But let's think about that one.

Any other comments or questions?

MR. SEEBALD: May I ask what the court found to overturn your order?

MR. POOLE: It was based on some pretty fuzzy technical data. And this is why, Murray, maybe the 180-day will do the trick. We were unable in sampling in 1969 to show any violation of our water quality criteria. We are just looking for 70 in lower stream flows.

MR. MILLER: This is a small plating plant above Fort Wayne on the stream. And there are times when he does a fairly good job. There are other times when he doesn't do a good job. And it is difficult, really, to run him down.

MR. STEIN: Right.

Well, thank you.

MR. POOLE: We might have to wait for a drought in Indiana. That's the reason maybe you can help us.

MR. STEIN: You know, we can bring on droughts, too.

We are going to change the procedure a little. I said we would finish all the States. But in looking at the time -- New York has a relatively short statement of about 15 minutes -- we will recess for lunch. Let's try to get back here at 1:30. We will take up the New York statement and then the mercury problem. And we will try to finish as early as possible this afternoon.

MR. EAGLE: Mr. Chairman, sorry to say we will be unable to be here this afternoon, but Mr. Van Den Berg of the FWQA has worked with us on the mercury problem and can speak for Ohio and make a report for Ohio on the mercury problem.

MR. STEIN: Again, I really appreciate that statement. You don't know how far we have come. Mr. Van Den Berg is our Federal official in Cincinnati who is in charge of the enforcement task force. And when the State of Ohio gives him the proxy to speak, I think we really have come a long way on this.

We will recess for lunch.

(Whereupon, at 12:10 o'clock p.m., the meeting recessed, to reconvene at 1:30 p.m. the same day.)

AFTERNOON SESSION

(1:40 p.m.)

MR. STEIN: Let's reconvene.

MR. MAYO: Mr. Chairman, during the presentation of the information on status of compliance of Federal facilities yesterday, Mr. Poole raised the question about the availability of comparable information to that which Mr. Harlow summarized for municipal and industrial installations. We have distributed for each of the conferees a summary sheet by name of agency giving the comparable status of compliance information. And this should be added to the earlier report as an appendix. (See p. 132A.)

MR. STEIN: Without objection, this will be done.

MR. PURDY: Mr. Stein, I have a question. Does this column mean that for U. S. Army, the total of 13 installations, the enforcement conference deadline was August 1966 and that now anything to the right of that column means that the schedule has been extended?

MR. STEIN: No, the schedule hasn't been extended at all. Anything to the right of that means they are in violation.

MR. PURDY: O.K., but they are beyond the original conference deadline. The conference deadline for all 13 U.S. Army installations was August of 1966, is that correct?

MR. STEIN: Mr. Gamet.

MR. GAMET: That was the recommendation of the conferees that all Federal installations should be in compliance by August of 1966. So as you say, everything to the right of that column means they are in violation.

MR. PURDY: If that would compare with the earlier charge, those that are behind schedule would be all of those under no established schedule and those in date scheduled for compliance in 1970, 1971 and 1972.

MR. GAMET: That is correct.

MR. POOLE: If I remember, back in 1966, out of fairness to the Federal installations, we were not considering vessels at that time.

MR. GAMET: I realize that, but as I stated yesterday, I felt with the recent legislation and interest and concern about waste from vessels, it was about time we included a report on these which we considered to be Federal installations.

MR. STEIN: Any other comments or questions at this time?

(No response.)

We will call on Mr. Seebald.

MR. SEEBALD: Mr. Chairman, I would like to point out that this will be the last report of the New York State

Department of Health as a member of this conference. The environmental health activities associated with water pollution will be taken over as of 1 July by the new Department of Environmental Conservation in the State of New York. And it is assumed that a representative of that department would then sit as a conferee in future reconventions of this conference.

And towards that purpose, I have passed out a progress report of the Department of Health on their pure water program. And in there there is an insert advising all who use it or have access to it of the creation of this new department. It contains the highlights of the accomplishments of the Department of Health in the water pollution field to date as of last December and points out the highlights of the program. I do not intend this should be a part of the record necessarily.

The presentation for New York will be made by Mr. Russell Mt. Pleasant, Director of Basin Development of the State Department of Health.

STATEMENT OF RUSSELL C. MT. PLEASANT

ASSOCIATE SANITARY ENGINEER

DIVISION OF PURE WATERS

NEW YORK STATE DEPARTMENT OF HEALTH

MR. MT. PLEASANT: Mr. Chairman, members of the conference, ladies and gentlemen, I am Russell Mt. Pleasant, Associate Sanitary Engineer, the Division of Pure Waters, New York State Department of Health.

We passed out the formal statement to be presented on behalf of New York State. All of the conferees have them. I have given the transcriber a copy. And there are a few extra copies on the front table here.

MR. STEIN: You are going to summarize this, aren't you?

MR. MT. PLEASANT: Yes.

MR. STEIN: Without objection, the full report will appear in the record as if read.

(The above-referred to report follows in its entirety.)

LAKE ERIE
ENFORCEMENT CONFERENCE
PROGRESS REPORT

REPORT TO THE CONFEREES

Detroit, Michigan

•

Submitted by

THE NEW YORK STATE DEPARTMENT OF HEALTH

HOLLIS S. INGRAHAM, M.D., COMMISSIONER

NEW YORK STATE DEPARTMENT OF HEALTH

DIVISION OF PURE WATERS

Progress Report to the Conferees of the Lake Erie Federal Water Pollution Enforcement Conference

June 3, 1970
Detroit, Michigan

The following resume will describe the status of New York State's water pollution control program as it effects Lake Erie water quality. As in the past, only those discharges having a significant effect directly or indirectly through Lake Erie tributaries from the Buffalo River to the New York-Pennsylvania state line inclusive, will be discussed. Comments will also be made regarding New York State's current program involving previous conference recommendations.

Enforcement Status

As of May 1, 1970, 17 of the 42 previously tabulated sources discharging into or effecting Lake Erie are considered abated, inactive or insignificant. The remaining 25 unabated polluters discharge a total of 225 MGD of wastewater. Four industries and one municipality (Section B of the Appendix) have facilities under construction which will intercept and treat 174 MGD. Eleven municipalities and four industries accounting for another 21 MGD of wastewater are in the final or preliminary design. One of these industries may be referred to the Attorney General if progress does not materially improve. Four industries and a village discharging a total of 30 MGD have been referred for legal action including Departmental penalty assessments or action by the Attorney General. Specifics relating to industrial projects are summarized in the attached appendix.

Construction Grants

New York State's Pure Water Enforcement and Construction Grant programs have generated $51.6 million worth of municipal construction projects for water pollution control in this portion of the Lake Erie Basin. State grants of $21.4 million are committed to these projects including pre-financing of the federal share where necessary. Similar expenditures by industries exceed $16 million for projects already completed or under construction. This construction program is in compliance with the $400,000+ comprehensive sewage planning effort for Cattaraugus, Chautauqua and Erie Counties. Also incorporated in this construction program are phosphorus removal processes as required in New York State by the policy which was announced a year ago in Cleveland.

Operation and Maintenance Grants

Although major emphasis is currently on enforcement and construction for the elimination of water pollution, efforts are continuing to concurrently obtain maximum performance from existing facilities. As an incentive, New York State communities may receive 33 1/3% reimbursement of their audited Operation and Maintenance expenses. Eligibility requirements include resolution by the governing body to adhere to a specified time schedule for remedial action, when necessary.

In the Lake Erie enforcement area as previously described, there are 37 sewage treatment plants serving a population of 181,000. 73% of these plants serving 97% of the sewered population have received Operation and Maintenance grants totaling about $1 million since 1965. This program has met with unqualified success in improving the level of plant operation and protection of water quality standards. More importantly, it has established strategic inroads with municipal officials in establishing awareness and good habits necessary for effective operation and protection of capital expenditures.

Highlights

Continued progress has been achieved towards meeting the objectives of the IJC and complying with the recommendations and conclusions established by the conferees of the Lake Erie Enforcement Conference. The Bethlehem Steel Corporation in the City of Lackawanna is setting the pace for pollution control. At this time, all nine (9) permits required for pollution abatement facilities have been issued for construction of works to treat approximately 126 MGD of wastes at an estimated construction cost of $10.8 million, $8 million of which is completed. These waste treatment facilities include treatment for hot and cold bar and strip and slabbing mill wastes; coke oven wastes; blast furnace and BOF including the final thickener, the cold mill and pickle liquor rinse water and deep well disposal of the concentrated waste pickle liquor. Two operation permits have been issued, one for the 45" slab mill wastewater and one for the 10" and 12" bar mills. These facilities treat up to 17.8 MGD. The other projects are very near completion and will go into operation in 1970.

The Moench Tannery, Division of Brown Shoe Corporation, located in the Village of Gowanda has completed and submitted final plans which provide for treatment to adequately reduce waste discharges to Cattaraugus Creek. This was approved April 23, 1970, and a construction permit issued. Construction is now underway to be completed by June 1971.

Republic Steel Company has $3.25 million worth of projects under construction to treat 23 MGD of process wastes from the Bar Mill, Blooming Mill, Blast Furnace and BOF. Completion of construction is expected by July 1971.

The Buffalo Dye Plant, Division of Allied Chemical Corporation, has facilities under construction to pretreat 4.5 MGD of process wastes before discharge to Buffalo Sewer Authority System. Actual tie-in to BSA System is scheduled for January 1971.

Final plans for secondary treatment at the City of Dunkirk, revised to include phosphorus removal, are scheduled for completion this month. Construction of the outfall line and interceptor sewer is already under construction with overall completion by November 1971.

Problem Areas

Problems have besieged the municipal-industrial complexes in the Villages of Fredonia and Westfield. In Fredonia, the consultant was required to conduct pilot plant studies in order to firm up final design. The contributory industry, Red Wing Company, has not taken significant action in construction of pretreatment facilities prior to discharge into the village system. This action is long overdue and consequently the company's case was referred to the Attorney General for legal action. The requirement for pilot plant studies has caused the village to fall behind the construction start date.

The joint municipal-industrial project for the Village of Westfield was not sufficiently supported with information on which to base final design. As a result, the consultant was required to conduct pilot plant studies with complete sampling and analysis to substantiate a rational design. Unfortunately, the canning season has passed and this sampling and pilot plant study was postponed until this coming September and October 1970. The village disengaged the original consultant and retained another firm which is also evaluating the industrial wastes from the three major food processing industries within the village. All four entities are committed to the same abatement schedule which is slated for initiation of construction by October 1, 1971. One of these, Welch Grape Juice Corporation, has been referred to the Attorney General's Office for legal action.

Status of Conference Recommendations

1. Nutrient Removal

The policy in New York State as developed and announced last year has been implemented. The City of Dunkirk is including phosphorus removal processes in final design. The Town of Hamburg Master Sewer District will also include removal units in its design. The City of Lackawanna has retained a consultant to evaluate the City's alternatives of upgrading to secondary treatment with phosphorus removal or connecting to the Hamburg Master plant. The Village of Westfield is faced with a nutrient deficient combined industrial waste. Evaluation of the relevance of phosphorus removal in this instance will be forthcoming in project design. The Villages of

Lancaster and Depew will connect to the BSA which is designing for phosphorus removal. The Ripley Sewer District and Village of Brocton are not within the scope of the requirements and will attain whatever levels of phosphorus treatment are inherent to conventional secondary treatment. There have not, as yet, been any industrial wastes identified as needing nutrient removal.

2. Deep Well Disposal

This method of waste disposal remains as one of last resort which must be demonstrated to be of least effect on the total environment. To date, two permits have been issued for construction of deep wells for waste disposal; the Hooker Chemical Corporation has recently abandoned this method of waste disposal and the Bethlehem Steel Corporation has not received an operating permit and has not yet used the well.

3. Bathing Beach Surveillance

This surveillance program was continued during the summer of 1969. One hundred and forty samples were bacteriologically analyzed for nine different Chautauqua County beaches. In Erie County, 308 samples were tested from seven different beaches. Extensive amounts of decomposing algae rendered two beaches in the City of Dunkirk unsuitable for bathing. Both were later reopened.

In Erie County, less than 1% of the 303 samples exceeded 2400 coliforms/100ml. Sanitary surveys and repeated sampling discounted the significance of these results.

4. Dredging

A meeting is scheduled with the Corp of Engineers tentatively June 1, 1970, to discuss disposal of harbor dredgings.

5. Oil and Gas Drilling

None of the prohibitive legislation introduced by various sponsors against leasing and drilling for oil and gas in New York's portion of Lake Erie was passed. However, the Commissioner of the Conservation Department has issued a two year moratorium on all activities relating to oil and gas exploration, drilling and production until the summer of 1972. To date, there have been no leasings granted.

6. Combine Storm and Sanitary Sewers

No change in status.

7. Prevention of Spills

A progress report through March 1970 on City of Buffalo's federal demonstration grant, "Program for Preventing and Eliminating Oil Pollution of Buffalo River" is summarized by each of four phases:

River Phase - On March 10, 1970, an oil leak into the Buffalo River of about 1300 gallons was discovered and traced to the failure of an 8" underground pipeline which carries "bunker C" fuel oil from the Mobil Oil refinery to Republic Steel. The City of Buffalo immediately offered use of equipment derived from this grant, to Republic Steel officials and installed 250 feet of Warne boom and two oil skimmers at the site of the accumulated oil. Straw was spread on the slick that had formed and Republic Steel personnel dredged and removed an unknown mass of oil and straw from the river bottom. Attempts to remove oil remaining on the surface and retained by the boom with two skimmers were hampered when straw clogged them. An air barrier has been installed across the river surface and experiments are being conducted on configuration and nozzle sizing to provide the most efficient air current under various flow conditions.

Sewer Phase - Work continued on the development of an UV oil detector and on other sensors of small quantities of oil. The former device is being calibrated and will be evaluated in the Buffalo River as a probe. Development continues of a sensor head suitable for sewer installation.

Oil Sampling, Identification and Analysis Phase - Investigation of techniques and their first quantitative results for analyzing bulk water samples are continuing. Analyses of oil in various samples from the Buffalo River supports earlier evidence that the river shore is an efficient oil-sink and will continue to replenish the decreasing river pollution level as cleanup measures are placed in operation. Vapor phase chromatography, UV spectroscopy and various extraction agents are undergoing evaluation.

Cost Analysis and Economic Evaluation Phase - The costs of controlling future oil pollution, as well as eliminating existing oil pollution will be determined for the Buffalo River and the associated municipal sewer system. The economic evaluation task has been postponed until the latter part of the 27 month program.

8. Elimination of Lake Front Municipal Refuse Dumps

No such sites on New York State's Lake Erie Waterfront.

9. Control of Deleterious Runoff

The advisory committee to the Commissioner of Health on agricultural drainage has prepared a final draft of the report entitled, "Guides for Controlling Contaminate Emission Released from Confinement Animal Production Farms". Non-point discharges from cattle or other livestock feeding or confinement areas are considerated as subject to provisions of existing Water Pollution Control Law. In this enforcement area, there have been no sizable such operations identified.

The Research and Development Unit of the Department is conducting a detailed pilot demonstration study of small lake basins in eastern New York State. The purpose of the study is to gain a better understanding of the eutrophication process in order that an effective control program can be carried out on a statewide basis. Basic data on the physical, hydrological, chemical and biological characteristics of the lake has been obtained. This provided the basis for formulation of a detailed plan of research from which to evaluate the need for and value of engineering control mechanisms such as advanced waste treatment, improved individual summer home disposal methods, changed agricultural practices, diversion of land run-off or waste, etc.. Completion of this phase is expected in 1970.

Once the necessary control measures are defined, the final phase of full scale demonstration of the engineering control measures found necessary will be performed to determine costs and effectiveness. This phase will be conducted during 1971 and 1972.

10. Industrial Effluent Sampling Programs

Industries discharging into or affecting water quality in Lake Erie routinely sample wastes, maintain records and report periodically to the New York State Health Department. Industries which are required to monitor these effluents as part of an active operating permit are:

Eastern Tanners Glue Co.	Gowanda (V)	Cattaraugus Co.
The Borden Company	Arcade (V)	Wyoming Co.
Bethlehem Steel	Lackawanna (C)	Erie Co.
Nuclear Fuels Services	Ashford (T)	Cattaraugus Co.
Penn Central Railroad	West Seneca (T)	Erie Co.
Allegany Ludlum Steel	Dunkirk (C)	Chautauqua Co.

Construction permits have been issued to the Penn Central Railroad in the City of Buffalo and the Moench Tannery in Gowanda. These industries will be required to maintain effluent sampling programs when construction is completed.

Testing and measuring is also carried on by the following industries included in the waste outlet registration program:

Allied Chemical	Buffalo (C)	Erie Co.
Donner Hanna	Buffalo (C)	Erie Co.
Socony Mobil Oil	Buffalo (C)	Erie Co.

Republic Steel	Buffalo (C)	Erie Co.
Niagara Mohawk	Dunkirk (C)	Erie Co.

These data are being reported to Albany on an annual summary basis for compilation and evaluation with respect to permit renewals and effects of waste on water quality.

11. Water Quality Surveillance Network

New York State has established a water quality surveillance network consisting of 116 sampling stations including 12 automatic monitors. Included in the Lake Erie Enforcement Conference area are manual sampling stations on the Buffalo River, 1.6 miles upstream from the mouth, on Buffalo Creek at the USGS gauging station in Gardenville approximately 10.4 miles upstream from its mouth, on Cattaraugus Creek at the Aldridge Street Bridge in Gowanda approximately 16.7 miles from Lake Erie, and in Buttermilk Creek at Thomas Corners Road Bridge about 0.2 miles upstream from the junction with Cattaraugus Creek. In addition an automatic monitor station has been placed in operation on Bird Island in Buffalo to continuously sample the Niagara River and Black Rock Canal.

12. Regional Planning

County-wide comprehensive sewage study have been completed for Erie, Chautauqua and Cattaraugus Counties. These studies initially were responsible for some delay in achieving compliance with abatement schedules. However this has been overcome and implementation is moving at a brisk rate. Requirements for compliance with comprehensive plan for construction grants eligibility have been successful in securing cooperation between neighboring communities.

Summary

In summary, treatment facilities are under construction to effectively treat over 75% of New York State's unabated wastewater discharges. Another 10% by volume are under preliminary or final design and the remaining 15% have been referred for Departmental penalty assessments and legal action by the Attorney General's Office.

A supplementary statement regarding the mercury problem in Lake Erie as it effects New York State is attached.

THIS CONCLUDES NEW YORK STATE'S PRESENTATION

Lake Erie Enforcement Conference

Progress Report

June 3, 1970

Detroit, Michigan

Supplemental Statement on Mercury in Lake Erie

Surface water supplies, wastewater outfalls, bottom sediments, and fish in Lake Erie were sampled and analyzed for mercury concentrations. Manufacturers, distributors and users of mercury and mercury compounds were inventoried. This investigation has been coordinated with FWQA.

As a result of this investigation, it was determined that the only industrial plant discharging mercury into the waters of Lake Erie was the Buffalo Dye Works Division of Allied Chemical Company in Buffalo. There is no evidence that this discharge effects mercury levels in Lake Erie water or fish samples due to its proximity to the Niagara River out flow.

However, on May 8, 1970, the company was directed to reduce the wastewater discharge of mercury by our Buffalo Regional Office. The company's response was to completely suspend the mercury using process. (Mercury is used in this instance as an intermediate in the production of dyes.) It was estimated that the company was using about 4 pounds/day of mercury before suspending the operation. On May 15, the company was directed to submit a plan by May 25, 1970, for elimination of the mercury discharge. This plan has been received and is being evaluated. In the meanwhile, operation of the mercury using process remains suspended.

POLLUTION ABATEMENT STATUS - LAKE ERIE

A. The following New York State polluters have abated their discharge (May 1, 1970):

Name and Location	MGD	Action Taken	Status
Huntley Mfg. Co. Brocton V.		Causes local pollution; no effect on Lake Erie. Connected to village sewer system.	Abated
R. C. McAteer Ripley T.		Connected to Ripley sewers.	Abated
Welch Grape Juice Brocton V.		Used for Storage purposes only.	Abated
Allegheny Ludlum Steel Corp. Dunkirk C.		Connected to municipal sewers.	Abated
Twin Cities Asphalt Dunkirk C.			Abated
City Laundry Dunkirk C.		Connected to municipal sewers.	Abated
Hanna Furnace Co. Lackawanna C.		Minor pollutional problem.	
Growers & Packers Coop. No. Collins V.		Plant used for storage only.	Abated
Dunkirk Conference Grounds Sheridan T.		Two months summer operation; private system adequate; under operational surveillance.	Abated

POLLUTION ABATEMENT STATUS - LAKE ERIE

A. (CONTINUED):

Name and Location	MGD	Action Taken	Status
Holy Cross Apostolic Center Dunkirk T.		Discontinued operation as Seminary 6/68; private system under surveillance and adequate.	Abated
Great Lakes Printing Co. Dunkirk C.			Abated
General Chemical Div. (Buffalo Chemical Works) Allied Chemical Corp. Buffalo C.			Abated
Niagara Mohawk Dunkirk C.			Abated
Old Dutch Foods Blasdell V.			Abated
Silver Creek (V)	0.50		Abated
Silver Creek Preserving Co. Silver Creek V.		Connected to Village; collection and treatment system 7/23/69.	Abated
Woodlawn Sewer District Hamburg T.	0.24	Satisfactory operation of facilities for the district.	Abated; close operational surveillance by Erie Co. Health Department.

*Under State Health Commissioner's Order.

POLLUTION ABATEMENT STATUS - LAKE ERIE

B. The following New York State polluters have Initiated Construction (May 1, 1970):

Name and Location	MGD	Action Required	Action Taken	Add'l Action Required
Moench Tannery* Gowanda V.	0.253	Complete construction by 6/71.	Initiated construction; permit issued 4/70.	Inspection of completed facilities and issuance of permit to operate.
Republic Steel Co.* Buffalo C.		Complete construction by 7/71.	Bar mill treatment facilities completed. Clarifiers and vacuum filters scheduled delivery in July, 1970 for Blast Furnace, B.O.F. and mill areas.	Inspection of completed works and issuance of permit to operate.
a. Bar Mill	14.500			
b. Blooming Mill, Blast Furnace, BOF	8.640			
Bethlehem Steel Co.* Lackawanna C.		Completed construction by 8/70.		Inspection of completed works and issuance of permits to operate.
a. 45" Slabbing Mill	8.640		a. In operation.	
b. 10" and 12" Bar Mills	9.200		b. In operation.	
c. Phase V - South Mills	8.640		c. - i. Under construction.	
d. Deep Well	0.100			
e. Phase VI - North Mills	12.250			
f. Phase IV - 79" Hot Strip	44.600			
g. Blast Furnace	30.000			
h. Phase IV-Cold Mills	7.200			
i. B.O.F.	19.500			
Dunkirk (C)* Chautauqua Co.	6.000	Submit final plans for STP by 6/70. Complete construction 11/71.	Outfall and interceptor sewer under construction; phosphorus removal to be included in final design.	Implementation of plans.
Buffalo Dye Plant* Buffalo C.	4.500	Connect to Buffalo Sewer Authority System by 1/71.	Pretreatment facilities under construction.	Complete construction and connect to BSA by 1/71.
TOTAL	174.023+			

*Under State Health Commissioner's Order.

POLLUTION ABATEMENT STATUS - LAKE ERIE

C. The following New York State polluters have Initiated Final or Preliminary Design:

Name and Location	MGD	Action Required	Action Taken	Add'l Action Required
Lawton's (H)* No. Collins (T)	Insignificant discharge			To be included in Town Comprehensive plan.
Eastern Tanners* Glue Div. (Peter Cooper) Gowanda (V)	3.0	Final plans submitted by 3/1/70; start construction 9/70; complete construction 6/71.	Pilot plant studies of 3 different processes being run to determine best method.	Meet start of construction date 9/70; If not, refer to Attorney General
Brocton (V)* Chautauqua Co.	0.35	Construct facilities	Wastewater facilities report approved, industrial contribution eliminated; construction schedule being negotiated.	Implement report
Donner Hanna Coke* Buffalo (C)		Installation of facilities for lime injection in ammonia stills by fall 1970.	In plant modifications completed.	Further reduction of ammonia discharge by lime injection.
Ripley Sewer District Ripley (T)	0.35	Preliminary plans by May 30, 1970; final plans - 10/70; start construction - 2/1/71; complete construction - 12/31/71.	Retained Hill & Hill Engineering Inc. to implement schedule.	Implementation of abatement schedule.
Fredonia (V)* Chautauqua Co.	2.14	Start construction 3/70, complete construction - 6/71.	Contracted with Pure Waters Authority; authorized consultant to conduct required pilot plant studies.	Proceed with final design and construction.

*Under State Health Commissioner's Order.

C. (CONTINUED):

Name and Location	MGD	Action Required	Action Taken	Add'l Action Required
Depew (V)* Erie Co.	2.0	Wastewater facility report-7/1/70; final plans 12/1/70; begin construction 3/1/71; final construction 10/1/72.	Has contracted with Erie County Sewer District #4, to connect to Buffalo Sewer System.	Implementation of abatement schedule.
Lancaster (V)* Erie Co.	1.18	Wastewater facility report-7/1/70; final plans 12/1/70; begin construction 3/1/71; final construction 10/1/72.	Incorporated in Erie County Sewer District #4.	
Hamburg (T) Master Sewer District Erie Co.	2.00	Provide secondary treatment and incorporation of other existing districts; Mt. Vernon S.D.; Wanakah S.D.	Wastewater and facilities report 1/1/71; final plans 12/1/71; begin construction 3/1/72; complete construction 5/1/73.	Implementation of abatement schedule.
Wanakah Sewer District Hamburg (T)	0.20	SEE ABOVE (Hamburg)(T)		Connect to Hamburg Sewer District
Mt. Vernon Sewer District* Hamburg (T)	0.20	SEE ABOVE (Hamburg) (T)		Connect to Hamburg Sewer District
Lackawanna (C) Erie Co.	8.0	Implementation of comprehensive plan, i.e, connection with Hamburg Master Plant or secondary treatment with nutrient removal.	Engineering consultant is actively involved in determining feasibility of joining Hamburg Master Plant or solo ventures.	Implement comprehensive plan.

*Under State Health Commissioner's Order.

POLLUTION ABATEMENT STATUS - LAKE ERIE

C. (CONTINUED):

Name and Location	MGD	Action Required	Action Taken	Add'l Action Required
Westfield (V)* Chautauqua Co.	1.5 Design	Preliminary report and Engineering Plans for treatment 1/15/71; final plans 6/15/71; start construction 10/1/71; complete construction 9/1/72.	Disengaged consulting engineer. Have retained Harnish & Lookup and established a tentative abatement schedule.	Implementation of abatement schedule.
Growers Cooperative Westfield (V)		Preliminary report and engineering plan 1/15/71; final plans 6/15/71; start construction 10/1/71; complete construction 9/1/72.	Harnish & Lookup Consulting Engineers engaged and have established same abatement schedule as Village.	Implementation of abatement schedule.
Seneca-Westfield Maid Westfield (V)		Preliminary report and engineering plan 1/15/71; final plans 6/15/71; start construction 10/1/71; complete construction 9/1/72.	Harnish & Lookup Consulting Engineers engaged and have established same abatement schedule as Village.	Implementation of abatement schedule.

*Under State Commissioner of Health Order.

POLLUTION ABATEMENT STATUS - LAKE ERIE

D. The following New York State polluters have been Referred for Legal Action:

Name and Location	MGD	Action Required	Action Taken	Add'l Action Required
North Collins (V)* Erie Co.	0.20	Provide wastewater treatment.	Referred for departmental penalty assessment proceedings under Section 1250, PHL. Village informed company they will not be allowed to use village system.	Comply with abatement schedule.
Producers and Canners Cooperative* No. Collins (V)	—	Provide industrial waste treatment.	SAME AS ABOVE	SAME AS ABOVE
Socony Mobil Oil* Buffalo (C)	28.5	Submit wastewater facility report; delinquent on Commissioners Orders.	Referred to Attorney General for legal action.	Follow recommendations of Attorney General.
Red Wing Co.*	0.56	Complete construction of pretreatment facilities by 6/69.	Referred to Attorney General for legal action; presently discharge into Village system; Article 78 proceedings also to challenge validity of Commissioner's Orders.	Follow recommendations of Attorney General.

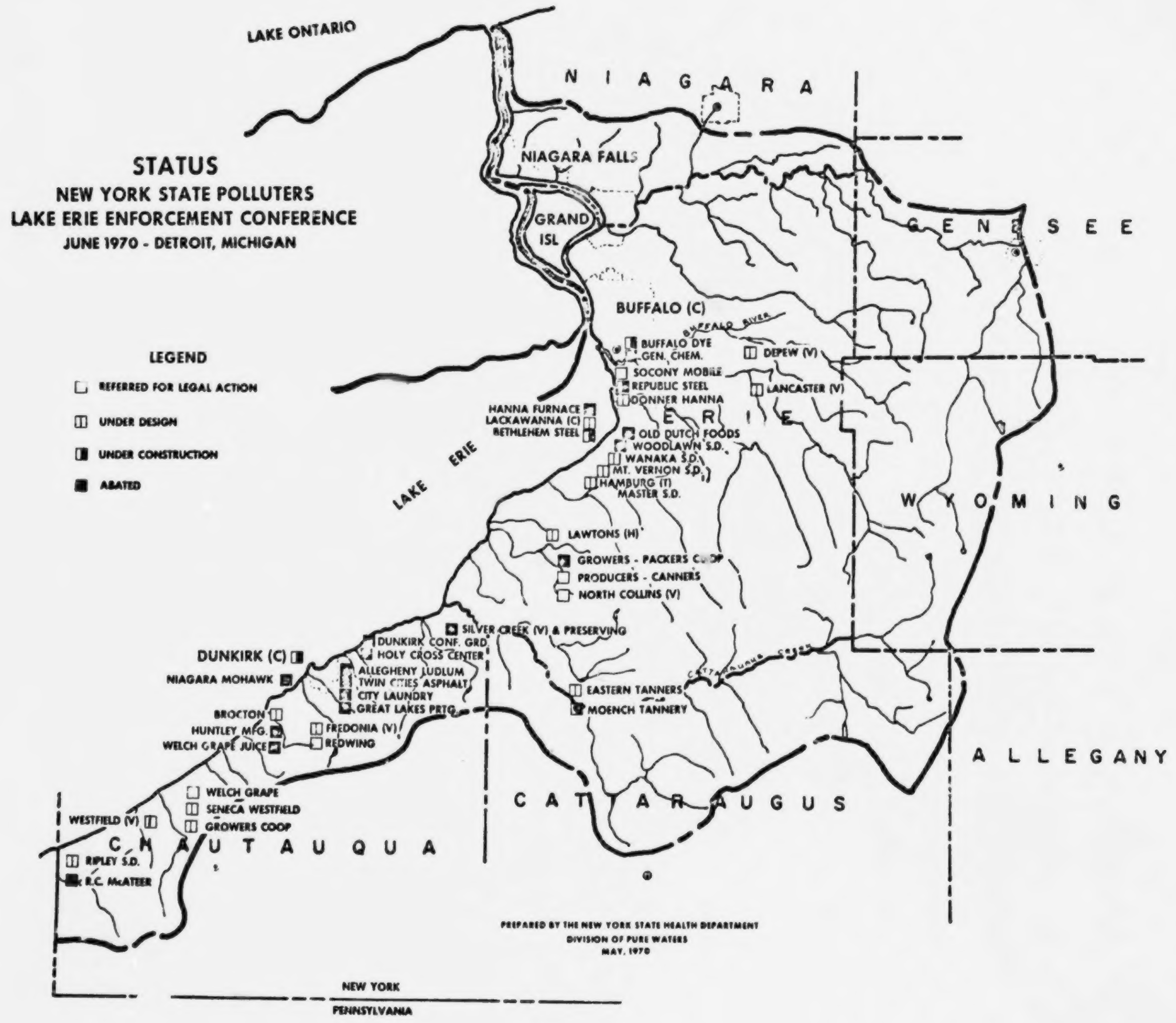
*Under State Commissioner of Health Order.

POLLUTION ABATEMENT STATUS - LAKE ERIE

D. (CONTINUED):

Name and Location	MGD	Action Required	Action Taken	Add'l Action Required
Welch's Grape Juice* Westfield (V)	—	Preliminary report and engineering plans 1/15/71; final plans 6/15/71; start construction 10/1/71; complete construction 9/1/72.	Referred to Attorney General for legal action; engaged Harnish and Lookup Consulting Engineers independently. Some abatement schedule as village.	Follow recommendations of Attorney General.

* Under State Commissioner of Health Order.



STATUS
NEW YORK STATE POLLUTERS
LAKE ERIE ENFORCEMENT CONFERENCE
JUNE 1970 - DETROIT, MICHIGAN

LEGEND
☐ REFERRED FOR LEGAL ACTION
◫ UNDER DESIGN
◧ UNDER CONSTRUCTION
■ ABATED
LAKE ONTARIO
NIAGARA
NIAGARA FALLS
GRAND ISL
GENESEE
BUFFALO (C)
BUFFALO RIVER
BUFFALO DYE
GEN. CHEM.
SOCONY MOBILE
REPUBLIC STEEL
DONNER HANNA
DEPEW (V)
LANCASTER (V)
HANNA FURNACE
LACKAWANNA (C)
BETHLEHEM STEEL
ERIE
OLD DUTCH FOODS
WOODLAWN S.D.
WANAKA S.D.
MT. VERNON S.D.
HAMBURG (T)
MASTER S.D.
LAKE ERIE
WYOMING
LAWTONS (H)
GROWERS - PACKERS COOP
PRODUCERS - CANNERS
NORTH COLLINS (V)
SILVER CREEK (V) & PRESERVING
DUNKIRK CONF. GRD
HOLY CROSS CENTER
DUNKIRK (C)
NIAGARA MOHAWK
ALLEGHENY LUDLUM
TWIN CITIES ASPHALT
CITY LAUNDRY
GREAT LAKES PRTG.
CATTARAUGUS CREEK
EASTERN TANNERS
MOENCH TANNERY
BROCTON
HUNTLEY MFG.
WELCH GRAPE JUICE
FREDONIA (V)
REDWING
ALLEGANY
WELCH GRAPE
SENECA WESTFIELD
GROWERS COOP
WESTFIELD (V)
CATTARAUGUS
CHAUTAUQUA
RIPLEY S.D.
R.C. McATEER
NEW YORK
PENNSYLVANIA

PREPARED BY THE NEW YORK STATE HEALTH DEPARTMENT
DIVISION OF PURE WATERS
MAY, 1970

MR. MT. PLEASANT: The purpose of the report is to describe the status of New York State's water pollution control program and also the progress made on the Enforcement Conference recommendations. As in the past, the report addresses itself to the wastewater discharges in the Lake Erie portion of New York State from the Buffalo River to the southern New York State-Pennsylvania State line.

The enforcement status: 17 of the 42 previously identified wastewater sources have been abated or have become inactive or are now considered insignificant. The remaining 25 unabated wastewater dischargers account for a total of 225 MGD of municipal or industrial wastewaters.

Four industries and one municipality out of this 25 have projects under construction which will intercept and treat about 174 MGD of this wastewater. Four industries and 11 municipalities accounting for another 21 million gallons of wastewaters have projects in final or preliminary design. Four industries and one municipality accounting for another 30 MGD of waste have been referred for legal action including penalty assessments and Attorney General action.

The specifics relating to the individual dates of the abatement schedules and action taken and action pending are included in the appendix attached to this report.

With respect to construction grants, New York

State's Pure Water Enforcement and Construction Grants Program has generated a $51.6 million worth of construction projects in this area for water pollution control. State grants to these projects amount to $21.4 million including prefinancing of Federal shares when necessary.

This construction is in compliance with the $400,000 comprehensive planning effort which is now completed for Erie, Cattaraugus and Chautauqua Counties.

This construction program is also incorporating the phosphorus removal requirements in New York State as described a year ago in Cleveland.

With respect to operation and maintenance grants, although major emphasis is currently on enforcement and construction, efforts are continuing to concurrently obtain the maximum performance from existing facilities. As an incentive, New York State communities may receive one-third reimbursement of audited operation and maintenance expenses.

And in this enforcement conference area, 37 sewage treatment plants currently serve an estimated 181,000 people. Seventy-three percent of these plants serving 97 percent of this population have received about $1 million in O&M grants since 1965. This indicates that these plants do treat within the design capability of the existing facilities and have committed themselves to an abatement schedule acceptable to the department.

Unqualified success in improving the level of plant operation and protection of water quality standards has resulted from this program. But more importantly, it has set the stage in establishing awareness and good habits essential for effective operation and protection of the capital expenditures underway.

In the area of highlights, I would like to just briefly run over the construction aspects of the waste sources in this enforcement area.

At Bethlehem Steel in Lackawanna, all 9 permits required for the construction of essential pollution control facilities have been issued by the Department of Health. Two operational permits have been issued, one for the 45-inch slab mill and one for the 10- and 12-inch bar mills, which will handle 17.8 MGD. These units are in operation.

The total construction program for Bethlehem is estimated at $10.8 million of which $8 million worth of projects are completed. Completion of all projects is expected by June 1971.

Republic Steel has $3.25 million worth of water pollution control projects under construction which will treat 23 MGD of process waste from the bar mill blast furnace and basic operation general furnace. Completion of construction at Republic Steel is expected by July 1971.

The Moench Tannery, Division of Brown Shoe, at Gowanda, New York, has completed and submitted final plans which provide for treatment to adequately reduce its waste discharges to Cattaraugus Creek prior to discharge into Lake Erie. Construction is now under way to be completed by June 1971.

The Buffalo Dye plant on the Buffalo River has facilities under construction to pretreat 4.5 MGD of waste prior to discharge to the Buffalo Sewer Authority System. Actual tie-in to the Buffalo Sewer Authority is scheduled by January 1971.

Finally, the City of Dunkirk is revising its final plans to include phosphorus removal which should be completed this month. Construction of the outfall line and the interceptor sewer is already under construction with overall completion by November 1971.

We have a couple of problem areas, just to briefly go over, mainly at joint municipal and industrial waste complexes. In Fredonia in Chautauqua County, pilot plant studies were required by the department to firm up final design. The major contributory industry in the village has not taken action to construct required pretreatment facilities and, consequently, has been referred to the Attorney

General's office for legal action.

MR. STEIN: What kind of company is that?

MR. MT. PLEASANT: That is the Red Wing Company.

MR. STEIN: What do they do?

MR. MT. PLEASANT: They make canning products, tomatoes.

MR. STEIN: It is a cannery?

MR. MT. PLEASANT: Yes.

MR. STEIN: Thank you.

MR. MT. PLEASANT: Requirement for pilot plant work on the Fredonia project has caused the village to fall behind on construction start date.

In the Village of Westfield, a similar problem is encountered where the consultant was also required to conduct pilot plant studies to verify waste characteristics and treatability. These studies will be performed during the upcoming canning season during September and October of this year.

The original consultant was disengaged and another firm which is also evaluating industrial wastes from the three major processing industries within the village was retained. All four entities are committed to the same abatement schedule with start of construction by November 1971.

One of the major industries, Welch Grape Juice, has been referred to the Attorney General for legal action because of inconsequential action taken on its requirements.

With respect to the conference recommendations, I will just skip through a couple of these. With respect to the nutrient removal policy, the policy that was described last year is being implemented. Municipal officials have been contacted by the health department and the policy described and their responsibilities included.

At this time, the City of Dunkirk, the Town of Hamburg master plan and the City of Lackawanna are being required to provide for phosphorus removal facilities.

The Villages of Lancaster and Depew in Erie County will be connecting to the Buffalo Sewer Authority which is also designing for phosphorus removal. So far, no industries have been identified as needing phosphorus removal.

With respect to deep well disposal, this alternative remains as a method of last resort which has to be demonstrated to have the least effect on the total environment. To date, in New York State, two construction permits have been issued, one to Hooker Chemical Corporation which is not in this particular area. This company has abandoned this method of disposal in favor of reclamation of the hydrochloric acid.

Bethlehem Steel Company has received the other construction permit. That well has been constructed, is not operating, and so far has not received an operating permit. We anticipate that before any operating permit is issued, if it is issued, it will be preceded by a public hearing.

With respect to bathing beach surveillance in Erie and Chautauqua Counties, nine Chautauqua County beaches were surveilled and seven Erie County beaches. None of these beaches were closed because of coliform results. There are two beaches in the City of Dunkirk that were closed because of decomposing algae, but were later reopened after clean-up.

I think before completing, I would like to include the statement on the mercury problem in Lake Erie as it affects New York State. This is a short one.

Surface water supplies, wastewater outfalls, bottom sediments, and fish in Lake Erie were sampled and analyzed for mercury concentrations. Manufacturers, distributors and users of mercury and mercury compounds were inventoried. This investigation has been coordinated with FWQA.

As a result of this investigation, it was determined that the only industrial plant discharging mercury into the waters of Lake Erie was the Buffalo Dye Works Division of Allied Chemical Company in Buffalo. There is no evidence that this discharge affects mercury levels in Lake Erie water or fish samples due to its proximity to the

Niagara River outflow.

However, on May 8, 1970, the company was directed to reduce this wastewater discharge of mercury by our Buffalo Regional Office. The company's response was to completely suspend the mercury-using process. In this instance, mercury is used as an intermediate in the production of dyes. It was estimated that the company was using about 4 pounds per day of mercury before suspending the operation. On May 15, the company was directed to submit a plan by May 25, 1970, for elimination of the mercury discharge. This plan has been received and is being evaluated. In the meanwhile, operation of the mercury-using process remains suspended.

That concludes this part of the presentation.

MR. STEIN: Thank you.

Are there any comments?

MR. MAYO: I notice the report didn't make any mention of the Mobil Oil refining problem.

MR. MT. PLEASANT: I will identify the wastewater sources that have been referred to the Attorney General for penalty proceedings. This is in Section D of the appendix. You are right, it isn't in the narrative.

North Collins Village in Erie County and Producers and Canners Cooperative in North Collins Village have been referred to departmental penalty proceedings under the public health law.

Socony Mobil Oil in Buffalo City has been referred to the Attorney General for legal action.

Red Wing Company in Chautauqua County and Fredonia has also been referred to the Attorney General for legal action. They are also challenging the validity of the Commissioner's order under an Article 78 proceeding.

MR. STEIN: What is the Mobil Oil problem? The reason I am asking the question is just from looking at the gallons per day discharge, they are by far the biggest non-compliance. Are they objecting to the authority?

MR. MT. PLEASANT: No.

MR. STEIN: What is the problem?

MR. MT. PLEASANT: Delay and non-compliance with the schedule just generally. Specifically, perhaps Mr. Seebald could elaborate.

MR. SEEBALD: They have high phenol in the oil and run antiquated oil removal apparatus. And they have failed to either renovate their existing equipment or provide us up until last week with a report on their intentions. We received this just late last week, but we will probably not take any direct action in response to this pending some advice from counsel inasmuch as it is in litigation right now.

MR. STEIN: I can understand that.

Any other comments or questions?

MR. SEEBALD: I would like to add just for the record that three pieces of legislation in New York State significant with respect to water pollution were passed by the legislature at the past session. One gives the department the authority to control the storage and transportation of hazardous liquids.

The second provides for an aid program to assist in the construction of lateral sewers in small communities.

A third involves raising the penalties for water pollution events from $500 to $2,500 in the first instance, and for a continuing discharge, a daily penalty raise from $100 to $500 per day.

In addition, I would like to emphasize that the problem in the municipal slippage as indicated in our tabulation is centered around the fact that implementation of the metropolitan plan provided for in the comprehensive study has been hampered by the lack of an effective umbrella agency for this type of implementation in Erie County and has not been due to any real foot dragging on the part of the communities themselves. They have been willing to amalgamate, but there has been no incentive at the top level. And actually the effectiveness that has been instant to date has been through the State requiring a combined approach to sewage and sewage treatment using the eligibility for grant assistance with Federal Government support hinging upon the requirement that they comply with the comprehensive study acceptable to the Commissioner. And it is to be hoped that the Federal Water Quality Administration will continue to support this comprehensive study to allow us to persuade these communities to join together.

I noted this morning it was brought up by Mr. Remus. It is one of his fond hopes that the Federal Government will continue to support this comprehensive approach to sewage treatment and not permit a GTA loan policy supplied with Federal or local assistance.

MR. STEIN: Are there any comments or questions?

MR. POOLE: May I ask one?

What about the local sewer program? How much funding was provided for that?

MR. SEEBALD: It has been a mystery. It was a $10 million appropriation. The first payments will not be made until next fiscal year, March 31, 1971. By that time, we hope to nail down just the exact amount of funding.

This last legislature adjourned in rather hurried fashion and left quite a bit of this legislation pending, including of most significance, of course, the funding of the various programs.

MR. POOLE: What percentage of the costs can you take?

MR. SEEBALD: It is based upon an upset figure of $150 per household connection, the State picking up the remainder up to the cost of the actual connection. This is based on a sliding scale with the base determined by the number of connections and the total cost of the project. As the number of connections increase, the actual per connection support will decrease.

MR. POOLE: Thank you.

MR. STEIN: Are there any other questions or comments?

(No response.)

If not, thank you very much.

I think that concludes the State presentations. Before we go into the consideration of mercury, do any of the States have anything for us to consider?

MR. PURDY: Only one suggestion, Mr. Stein. And this is to expand your request to have a joint Federal-State review of the Ford Motor Company project. I would like to expand that to have a joint Federal-State on-site review of all of those projects that are listed in your report as being behind schedule so that there will be a complete understanding on both sides here.

MR. STEIN Will that be agreeable?

If I understand the suggestion -- and I might say I think this is good -- if we have projects which are listed as behind schedule in our report, we should be able to get together with the State concerned and hopefully the industry and come up with a statement on that project which is agreed to, factual statement which is agreed to. That State, the Federal Government and hopefully the industry ought to give a substantial description of what the situation is. This will be based on inspection where you think it appropriate and not just representation.

MR. PURDY: That's right. Where facilities are under construction and so forth, this will be an on-site inspection.

MR. STEIN: I visualize this to be somewhat like the reports we got of the 180-day notice reports where we signed off that everyone was in agreement that this was what the situation is. And in all those cases, by the way, I think we all are in agreement that the program is proceeding and no further action is necessary.

MR. PURDY: I hope we can reach that conclusion.

MR. STEIN Well, I don't know, but I think the only possible way you can reach that is for everyone to agree on the facts.

MR. PURDY: Right.

MR. STEIN: And this is what I think Mr. Purdy is proposing. Will we be able to do that with them?

MR. MAYO: As far as the regional facilities are concerned, it is going to be a very substantial work load. We would have to sit down and from the Regional Office establish point and make some evaluation of what it would require in the way of manpower and resources to conduct what may be a hundred or more inspections.

MR. STEIN: Well, let me make this offer to you: We will supply the people to you from our national resources to do that because I think this is essential. Otherwise, we are just going to come here and in the absence of an inspection and an agreed-upon report, we are going to necessarily get disparities. And we are at the stage of the case where I think we have to get down to the hard facts.

By the way, let me tell you when this was done in Ohio, there was complete agreement as far as I know with the city, the industries, the State and the Federal Government, on the facts of the five cases involved. And as far as I can see, there is no factual problem or difference now.

We have the same situation involving that Eagle Petrol case. And I think this is just one activity that we are going to have to engage in if we are going to deal with compliance or alleged violations to determine whether further action is necessary or not. And I don't see if you are ever considering modifying or overlooking the compliance how you could ever make the recommendation without having this. I myself can't see how we possibly can move ahead.

MR. POOLE: I would like to put in a bid to have that done for the Indiana projects also, Mr. Chairman.

MR. STEIN: Is this agreeable?

MR. LYON: Do I understand this correctly, Mr. Chairman, you are planning to go over every project that is behind schedule?

MR. STEIN: That is alleged to be behind schedule so we have an agreed-upon factual statement with the industry if we can get it, but certainly with the State and Federal Government.

MR. LYON: They will be done at these regional conferences?

MR. STEIN: No, we will send our men out with you and make arrangements to do it. Because in a lot of cases, you are going to sit down in the office. And as you and I well know, you can talk and talk, but you have to go out and look before you are going to decide what the situation is.

MR. LYON: Well, let me just try to clarify this.

Are you saying that you are going to physically visit every single sewerage source and every single industrial waste source that is in fact behind the original schedule that was set up originally?

MR. STEIN: No. What I am saying is where you could not come to an agreement by sitting in the office or where there is a doubt, then you have to go out and look. Obviously, you are not going to spend time, I would hope, where everyone is in agreement or you feel there is no doubt.

MR. LYON: I misunderstood.

MR. MAYO: Then, I misunderstood also, Mr. Chairman. Under those circumstances, I think we can work within our existing resource.

MR. HARLOW: I think we ought to recognize, Mr. Chairman, though, probably over half the cities and industries involved here are in Ohio. And Ohio is not here to speak for this.

MR. STEIN: We will offer this.

Now, my guess with Ohio is that Ohio will participate as you could tell with their approach here today. They have participated with us in the past. And as a matter of fact, maybe we should take our hat off; because before, when Mr. Purdy suggested that we come to this stage with these Ohio communities, they made a request that someone from the

Federal Government attend their monthly meetings -- each one -- so as these came up, we and they could proceed on the same set of assumptions on the facts. If there were any differences in the facts, we could go out and investigate them and see what the truth of the matter was. I have no doubt that Ohio is going to push this.

I think in the absence of this, as they say back at home, it is going to be more work for mother. This is the fastest way of doing it.

Unless we can get agreement and complete agreement between the State and the Federal Government on the facts at this stage of the operation, we may embark on procedures which can be very time-consuming and have really drastic legal consequences. So I think we have to keep that in mind and move. And hopefully, the industries and the cities will join us in that. Because I think this is to everyone's benefit.

MR. LYON: My confusion arises, and I think we have already spent a lot of time -- almost two days here -- in this thing, is this something that is going to happen before these regional meetings or is this joint Federal-State review? Will this happen, for example, in Pennsylvania? When you come to Erie, are we going to look at the facts and --

MR. STEIN: No, no.

MR. LYON: May I finish this point? Am I correct that we are going to then look at the record, and if we agree, that is fine. And if we don't agree, then we are going to go out in the field and look at it?

MR. STEIN: Right.

MR. LYON: But the Erie meeting will be the time when we carefully review each case?

MR. STEIN: When we see what we have to do.

Now, the Erie meeting also, as I understand it, has another aspect. At the Erie meeting, we will want to hear from the industry and the people and other jobs to see what information they have. They may raise some points which may require investigation before we can lay those to rest and settle them.

MR. LYON: My only concern is that we try to as efficiently as we can get together on information. We find that we are spending so much of our time giving information to the Federal Government and going to meetings that we don't have much time left to clean up the pollution. So my only suggestion is let's please make this process official so we don't have to write 10 more letters and write five more reports and go to five more meetings. If we can clean this up at the Erie meetings and if there are any differences, fine, we will go out and look at the facts.

We feel the Federal Government should have all the facts and should take enforcement action when it is needed. But let's try to somehow streamline this process. We feel very frustrated by the many Federal reports we have to submit. And frankly, we just don't have the man-hours. We think our time should be spent cleaning out pollution.

MR. HARLOW: Since it looks like my office may be doing some of this work, I want to make sure I understand what it is you are asking for.

Now, if you are talking about putting together, like you said before, some kind of statement regarding what we did on the 180-day notices, I think you are talking about a major undertaking. But if you are talking about just sitting down in the State offices and going over city by city, industry by industry, those that are behind and coming to an agreement on what the status is, my first reaction is that this, we already have.

MR. LYON: That's right. We just did that. We just sat down.

MR. HARLOW: We have been doing that the last three or four weeks.

MR. STEIN: I am not sure you are in complete agreement, and I am not sure you have checked these facts out on the basis of an inspection.

MR. LYON: Mr. Chairman, they change almost from day to day. So you will undoubtedly find that the facts in some of these cases will have been changed by next week, some for the better, some for the worse.

MR. STEIN: No one is arguing about those changes. We are talking about apparent differences in Federal, State and industry reports when they come in at the same time.

Now, I thoroughly agree with what this is going to say, but one of the reasons, I think, is not because it is a Federal or State report or a meeting. I think if we are going to sit around on our bureaucratic rear ends, I fear we are going to get enmeshed in operations. And if it takes us this long to get a simple inspection and recording system off, I understand why it takes so long. I don't look for this to be an involved operation.

MR. LYON: Yes, but the problem is, Murray, we were just asked by your Charlottesville office for the same information about two months ago. And it is taking us literally thousands of man-hours to put all of this information together. We separately gave it to Mr. Harlow. We also have to submit it separately as part of the comprehensive planning process.

And frankly, I am not going to keep any more people in the office to do clerical work. We simply have got to get out into the field and check on polluters.

Last year, Pennsylvania lost 6,000 inspections because we were kept in the office doing clerical work, filling out Federal reports. And we simply can't do any more.

MR. STEIN: I think maybe I misunderstood Mr. Purdy, but if you think this involves clerical work, I think we missed the point.

MR. LYON: If it doesn't, we have got no problem.

MR. POOLE: Mr. Chairman, may I get in? As you well know, we did some of this with both Illinois and Indiana industries in the south end of Lake Michigan. And it was a special project, Walt. But it was done in a very short period of time -- in this case, I think a matter of about two and one-half weeks. And my judgment is that it had a very healthy effect on a portion, at least, of the people that we looked at in those inspections.

Like Pennsylvania, I don't want to get involved in a lot more paper shuffling and report writing and office work. But what I visualized as Purdy and the chairman started discussing this is that I would like for somebody to come down to the office and we will go over our list and then jointly go into the field and sort of put it up to them, whether it be a city or an industry, that we have come here to look things over to make up our mind whether or not the 180-day notice ought to be filed against them.

And I think that that kind of a visit will shake some of these places off of dead center whereas if I go back to Indianapolis in the morning and say, "I have been up to Detroit two days, and you are behind schedule, and people are getting awfully impatient about this and you better get on the ball," they will pay a lot more attention to the joint inspection than they will to that communication from me.

So I would not like to reserve the Indiana work only to either industries or cities where there is a difference of opinion between my office and Mr. Mayo's office or Harlow's office as to the rate of progress. I think it is workable. I don't think it will take too much time.

And if you want to know what I actually think about it from the standpoint of pollution abatement, I think it will do a hell of a lot more good than sitting here at this table talking about it for the last two days.

MR. STEIN: I agree with you.

May I make just one more comment as an example here? Going to a major United States steel company -- and I was there with George -- we went there on one of these visits, and we looked at the effluent coming out of their operation. And they had a pretty extensive operation. The air looked like about the color of this cigar, maybe a little lighter. And they bragged in the office.

I said, "Let's see the effluent line." I said, "Do you mean this is what you are putting out?"

And they indicated some days it is better, some days it is worse.

I said, "Well, you know, this is a great thing. What would you have done today if I came down with the League of Women Voters and they saw this effluent?"

Well, we had a little polite conversation. Then the companies were served with 180-day notices.

When George Harlow went back there the next week, do you know what the color of that effluent was? The color of this water. And it was the same facility.

I agree with Mr. Poole, if we can get that kind of improvement with just a little visit like that, it does a lot more good when you give this individual attention and spotlight the facts than by almost any other method.

The reason I say that is I think we are at this stage of the game. In these earlier planning stages dealing with preliminary reports, this wouldn't be effective. But at the stage of compliance and enforcement we are at now, I think this can be the most effective method and produce the most rapid results.

MR. LYON: No objection at all to that as long as we don't get a letter from George Harlow asking us to once more update all our cases. I would be happy to review every one of them at the yearly meeting and cooperate with you.

MR. MAYO: Mr. Chairman, the Regional Office will accept the responsibility for putting together a schedule. And we will be in touch with you.

MR. STEIN: All right, is there anything else before we go on to mercury?

(No response.)

Let's go on, then. Mr. Mayo.

MR. MAYO: Yes. The presentation of the mercury report for the Federal Water Quality Administration will be given by Mr. Lowell Van Den Berg, Assistant to the Director of the National Field Investigating Center of FWQA, Cincinnati, Ohio.

I understand that a Mr. Beebe of the Food and Drug Administration may be available here this afternoon. Is he in the audience?

STATEMENT OF LOWELL A. VAN DEN BERG

ASSISTANT TO THE DIRECTOR

NATIONAL FIELD INVESTIGATIONS CENTER

FEDERAL WATER QUALITY ADMINISTRATION

CINCINNATI, OHIO

MR. VAN DEN BERG: Mr. Chairman, I have additional information since this report was compiled. I took the liberty last night of incorporating that data in this one revised copy. So I will update the report and send you a copy for inclusion in the record.

MR. STEIN: Yes, go ahead.

MR. VAN DEN BERG: This report was compiled by personnel from the Great Lakes Regional Office, Lake Huron Basin Office and Lake Erie Basin Office, in cooperation with personnel of the National Field Investigations Center.

The introduction starts on page 8.

The toxic effects of mercury and its compounds in the water environment are well known and are documented in the literature. However, much remains to be learned on toxicity limits of the various mercurial compounds in the water environment. The upper limit of mercury in food, used by the Food and Drug Administration, is 0.5 ppm wet weight. Limits have also been set for atmospheric concentrations and numerous cases of poisoning have been reported.

Critical pollution from mercury became apparent on March 24, 1970, in the Great Lakes. Mercury concentrations as high as 500 parts per billion (or 5 ppm) were reported in some of the pickerel shipments from Canada and commercial fishing involved was suspended by Canada, then Ohio, Michigan and New York. The presence of mercury in fish and bottom sediments in the St. Clair River-Lake Erie system has confirmed the existence of an environmental problem of major scope.

Mercury is discharged to the water environment from industrial processes and uses of mercurial products. In 1968, mercury produced from mining in the United States was 2,194,000 pounds. The total amount used in 1968, however, was 5,732,000 pounds. Over 163 million pounds of mercury have been consumed in the United States in the present century, but little information is available on the final disposition of it and amounts accumulated in the environment.

Metallic mercury and mercurial compounds in liquid wastes are characterized by their high densities. Free mercury and the mercurous compounds form sludges and settle to the bottom of receiving waters. The mercuric compounds form precipitates with oxides, phosphates, sulfides and carbonates. The high density is responsible for the rapid deposition in bottom sediments where they persist, become subject to sediment transport and are available to the aquatic life.

Metallic mercury can be oxidized readily to divalent mercury ions under the conditions present at the bottom of lakes and rivers. This has been shown to occur experimentally as well. The divalent inorganic mercury produced has an extremely strong affinity for organic muds and is methylated in the bottom sediments. Divalent organic mercury, when methylated, is readily released from the sediments into the water.

Many fish are bottom feeders or feed upon organisms which are bottom dwellers and therefore the hazard of mercury ingestion becomes very great. Fish also absorb mercury from the water through the gills and possibly the scales.

Since biological concentration of mercury occurs, the accumulation of mercury in the food chain is a matter of grave concern. A recent report indicates a magnification or concentration of mercury of over a million in the protoplasm of bacterial species. It has been demonstrated that the concentration from water to pike is in the order of 3,000 or more.

Uses of Mercury

Sources of mercury in the environment principally come from industrial processes utilizing a form of mercury and the use of mercurial products by man.

The industrial uses in 1968 are listed as follows: These values are in thousands of pounds.

1.	Electrical apparatus	1,492
2.	Electrolytic preparation of chlorine and caustic soda	1,326
3.	Paints	803
4.	Charging new installations of chlorine and caustic soda cells	630
5.	Industrial and control instruments	581
6.	Agricultural uses	260
7.	Dental preparations	158
8.	Catalyst preparations	145
9.	Laboratory uses	151
10.	Pharmaceuticals	32
11.	Pulp and paper uses	31
12.	Amalgamation	20

Mercury is used as the cathode in the electrolytic manufacture of chlorine with caustic soda and hydrogen as by-products. Cell recharging to make up the various losses from this process was 26 percent of the total mercury used in 1968 by all industries. To maintain the mercury inventory it required purchases of 1.3 million pounds of mercury in 1968. Weak spent brines, acids from the chlorine driers, brine sludges and cell cleanings are discharged to the water environment from this process. The mercury may be metallic mercury emulsion, soluble and insoluble mercury salts.

In 1968, 630,000 pounds of mercury were used in the start-up of new electrolytic installations. This amount eventually contributes to the cell losses.

Information from manufactures of mercurials used for herbicides, fungicides and bactericides is not readily available. These compounds usually are produced in batch processes and require considerable cleanup with possible losses of mercury.

In the pulp and paper industry, phenyl mercury acetate is used for slime control and ground wood pulp may contain up to 20 ppm of the fungicide. This mercury is either lost to the product or to the waste load during processing. In either case it becomes a waste.

Large quantities of mercury are used in the manufacture of electrical apparatus and industrial and control instruments such as mercury cells, arc lights, pumps and switches. This poses a hazard of loss during the manufacturing process.

Catalysts, containing 10 percent mercuric chloride are manufactured for use by the petrochemical industry. This is made by passing a water solution of mercuric chloride over carbon and is used for making vinyl chloride from acetylene. Another catalyst containing mercuric sulfate is used in processing acetylene to acetaldehyde. There are losses to the water environment from these processes.

Paints, those used for mildew control as well as those having anti-fouling characteristics, contain mercury, usually in the organic form. Erosion from paint films containing these compounds is another source of loss to the environment.

Mercury is used in dentistry for the preparation of amalgams. Minor losses may result from this use.

Laboratory use of mercury in manometers, thermometers, calomel cells, standard cells and as reagents results in an occasional discharge to sewers. In large research centers or universities, the quantities can become appreciable.

Minor users of mercury are the pharmaceutical manufacturers and in amalgamation. In the pharmaceutical manufacture, diuretics and antiseptics, i.e. calomel, phenyl mercury acetate and merthiolate are made. Accidental spills are the source of loss to the water environment.

The recovery of gold and silver by mercury amalgam is a wet process and may result in rather high losses of mercury in the plant effluent.

Additional mercury is introduced to the water environment through the use of products containing mercurial compounds. The most widespread example of this is in the agricultural application of fungicides and pesticides, which results in losses during periods of runoff from the area to which they are applied.

The FWQA-Lake Huron Basin Office (LHBO) initiated a water and sediment sampling and analysis program for mercury in the St. Clair River to Lake Erie system immediately after the Canadian Government announced the fishing ban in Lake St. Clair on March 24, 1970.

Sample collections were made by personnel from the Lake Huron Basin Office with assistance from the Michigan Water Resources Commission.

Water samples were collected with a surface grab-sampler. Sediment samples are obtained by the use of either a Petersen dredge or a drag line sampler. These devices penetrate the bottom to about one-fourth foot.

The State of Michigan reports no measurable mercury in any water supply intakes within this area.

Page 15 is one of those which I rewrote.

St. Clair River and Lake St. Clair. Fifteen sediment samples and 6 water samples were collected in the St. Clair River. All water samples contain less than the measurable concentration at 37, 33 and 25.5. They contain concentrations of 1.0, 0.2 and 0.3 milligrams per kilogram by weight respectively.

The other 12 sediment samples contain less than the measurable limit of 0.5 milligrams per kilogram wet weight, but indicated traces of mercury were present.

In Lake St. Clair, one water sample and 26 sediment samples were analyzed. Six sediment samples and a navigation channel close on the U. S. side contain mercury and are in concentrations from 0.3 to 9.2 milligrams per kilogram.

Two samples from a disposal area outside the channel contain mercury concentrations of 1.5 to 2.1 milligrams per kilogram dry weight.

The other 18 sediment samples indicated the presence of mercury, but were less than the measurable limit.

Upper Detroit River (Lake St. Clair to Grassy Island), page 20, sampling of the upper Detroit River and lower Rouge River began on March 26, 1970, and continued to April 24. Sixteen sediment and 6 water samples were obtained. Mercury was detected in sediments along the U. S. Shore line at boat ramps and in other backwater areas. Values ranged from below the measurable level near the headwaters to 2.0 mg/kg downstream from the Rouge River. Levels in sediments around Grassy Island and upper Fighting Island were all below the measurable limit.

Lower Detroit River (Grassy Island to Mouth).

In the portion of the Detroit River from Grassy Island to the mouth of Lake Erie, 78 sediment and 23 water samples were collected between March 26 and April 16. The highest levels of mercury occurred in the bottom muds of the Trenton channel downstream from the Wyandotte Chemicals Corporation South Works, in a narrow strip of from 20 to 100 feet along the western shore. Concentrations along the east shore of the channel near Grosse Ile are less than the measurable limit of 0.5 mg/kg. Mercury in the sediments indicates that the Wyandotte Chemicals mercury discharge hugs the western shore of the Trenton channel, depositing mercury in the bottom muds along shore. No mercury deposits were found around Wyandotte Chemicals waste beds, located on the northern tip of Grosse Ile. However, one sample collected between Grassy Island and Grosse Ile contained 4.4 mg/kg mercury.

Mercury concentration in sediments was found along shore as far as Lake Erie. In addition to high values near Wyandotte Chemicals, one sample with 26.0 mg/kg dry weight was present at the northern tip of Horse Island (Gibraltar, Michigan) at mile point 6.7.

Of the four samples collected at the southern end of Fighting Island, one contained 1.2 mg/kg mercury, and the others contained trace amounts, but were less than the measurable limit. Wyandotte Chemicals waste lagoons are located on Fighting Island.

The only mercury measurable in four samples in Canadian sediments was near the shore at mile point 3.9. That value was 0.6 mg/kg.

The levels of mercury in all water samples but one were below the measurable limit of 0.01 mg/l. One sample collected 300 feet downstream from Wyandotte Chemicals outfall W23 (RM 13.3) contained 0.03 mg/l March 31, 1970. The effluent was diluted by Detroit River water so mercury was not measurable further downstream from the discharge point.

Western Basin of Lake Erie, including the Raisin and Maumee Rivers.

The sampling of Lake Erie began on April 6, 1970, with bottom sediments collected at two stations near the mouth of the Huron River. From April 6 to April 27, 44 bottom sediment stations were sampled. Samples were collected in western Lake Erie west of Pelee Island, with the majority of samples collected near the mouths of Michigan tributaries. Based on the measurable limit of 0.5 mg/kg wet weight, mercury was present at 16 of the 44 stations, although traces were found at most of the other stations.

The Raisin River was sampled on two different dates at three stations. Traces of mercury were found; however, all results were less than the measurable limit.

The Maumee River was sampled on April 17 at six stations, and traces of mercury were found at most stations; however, all results were less than the measurable limit.

The 16 stations where mercury was found are located in the deepwater areas of the western basin of Lake Erie from the mouth of the Detroit River southward and eastward. Since shore line and minor tributary samples do not show appreciable amounts of mercury, the Detroit River appears to be the principal source, with mercury being deposited in the deeper quiescent parts of the lake.

Mercury analyses in the eastern portion of the Lake Erie Basin.

As part of its mercury investigations in the Lake Erie Basin, the Federal Water Quality Administration-Lake Erie Basin Office analyzed bottom sediments from the lower portions of south shore tributaries and from the lake bottom. Tables 10 and 11 include results from the sediment and water analyses to 5/12/70 except those made at the Detrex Chemical Corporation plant. Detrex analyses are listed in a special report on the plant (Appendix II).

At the Lake Erie Basin Office the lower limit of measurability of mercury in sediments is 1 mg/kg and in water 0.002 mg/l.

The States of Ohio, Pennsylvania, and New York report no measurable mercury in any water supply intakes within this area.

In Table 10 on page 39, you will note that mercury concentrations at the hydro discharge to Grand River, Diamond Shamrock, Painesville, is 0.01 mg/l.

Euclid sewage treatment plant is 0.004.

Cleveland Southerly STP 0.004

Cleveland Westerly STP 0.003

Cleveland Eastern STP, less than 0.002

Mile 1.0 West Branch Ashtabula River 200 feet downstream from titanium plant, less than 0.002

General Electric, Nela Park, Cleveland - discharge 3 gallons cover water every two weeks 1.060

This is a very insignificant amount of mercury on a daily basis, but on Table 11 is Black River at mile 0.61, 8.

One hundred feet north of the Easterly sewage and treatment outfall, it was 4 mg/kg.

Fifty feet north of the East 222nd Street - Babbitt Road sewer outfall in Euclid, it was 2 mg/kg.

The Ashtabula River at 0.76 mile, it was 2 mg/kg.

And No Name Ditch east of Ashtabula at Route 531 bridge, it was 8 mg/kg.

The only other measurable mercury level in sediment are on page 42. River mile 0.0, Buffalo River, 4 mg/kg.

River mile 4.3, the Buffalo River, 1 mg/kg.

Heavy metals in the Lake Erie Basin.

As part of the investigations in the Lake Erie Basin, the FWQA, National Field Investigations Center analyzed bottom sediments from various shore areas and tributaries. The results of analyses for 10 heavy metals -- magnesium, chromium, polonium, nickel, mercury, manganese, iron, copper, zinc and cadmium. Stations were selected in the mouth of tributaries and immediately off-shore.

Heavy metals are toxic to aquatic bottom organisms and fish when present in sufficient concentrations. Combinations of some of these metals such as copper and zinc have a total toxicity greater than the sum of the toxicities of each metal taken independently. Metals such as iron oxides precipitate in water and may blanket the bottom and smother bottom organisms. Toxic metals in bottom muds can be made available to the overlying water by physical, chemical or biological means. Metals may re-enter the overlying water by scouring of the stream bed because of velocity increases, by wave action, or other water turbulences. These metals may also be resolubilized by the waterbody dependent upon environmental conditions such as pH, temperature and concentrations of other metals present. Some of these metals may also be detrimental to aquatic organisms when concentrated in the food web.

Summary and conclusions, page 1.

1. Data provided for the Bureau of Commercial Fisheries, Technological Laboratory, Ann Arbor, Michigan, show that mercury was present in fish throughout the St. Clair River-Lake Erie system. Concentrations (parts per million, wet weight) in the edible portions of various fish were: Keep in mind the F.D.A. limit 0.5 ppm.

Yellow Perch		0.32 to 1.70
Northern Pike		0.64
Coho Salmon		0.24 to 0.96
Carp		0.08 to 0.28
White Bass		0.53 to 0.80
Steelhead	less than	0.15
Walleye Pike		1.4 to 3.57
Channel Catfish		0.32 to 1.8
Gizzard Shad		0.24
Sucker		0.88
Sheepshead		0.24

2. Available information indicates that no measurable

concentration of mercury was present in water supply intakes in the St. Clair River-Lake Erie system.

3. Mercury in excess of 1 mg/kg dry weight was present in sediments in the Erie, Pennsylvania, in Euclid and Cleveland, Ohio, areas and the Buffalo, Black and Ashtabula Rivers. Results of analyses indicate the following levels of mercury in the areas specified:

The first area has been rewritten as a result of newer data.

In the St. Clair River, mercury was present at mile .37, 33 and 25.5 at concentrations from 0.2 to 1.0 mg/kg. All other samples indicated the presence of mercury.

Six sediment samples from the navigable channel in Lake St. Clair off-shore from the mouth of the St. Clair River had mercury concentrations from 0.3 to 9.2 mg/kg dry weight.

The upper Detroit River headquarters to Grassy Island, mercury was not measurable at the head of the Detroit River, but ranged from 1.4 mg/kg in backwater areas to the U. S. shore upstream from the Rouge River and as high as 2.0 mg/kg in backwater areas downstream from the Rouge.

The lower Detroit River, Trenton channel, in a narrow strip of about 20 to 100 feet along the U. S. Shore line, concentrations range from 86.0 to 5.4 mg/kg within a mile downstream from the Wyandotte Chemicals outfall and then vary from 26.0 mg/kg to trace amounts downstream to Lake Erie depending on the settling characteristics of the specific point.

The main channel of the Detroit River, one sample collected between Grassy Island and Grosse Ile contained 4.4 mg/kg. On the east side of Fighting Island, one contained 1.2 mg/kg. And one near the Canadian shore near the mouth contained 0.6 mg/kg.

Northern Grosse Ile, no mercury was present in measurable amounts in samples along the northern part of Grosse Ile, the area of Wyandotte Chemicals waste beds, but trace amounts were indicated.

Western Lake Erie, Michigan waters, concentrations near the Detroit River varied from 1.0 to 2.1 mg/kg. Along the Michigan shore, mercury was not measurable. Near LaPlaisance Bay, one sample contained 0.8 mg/kg.

Ohio waters, four points near West Sister Island have values ranging from 1.6 to 2.1 mg/kg. In other areas nearer to shore, mercury was not measurable.

Canadian waters, concentrations of 1.3 to 2.7 mg/kg were present at three points extending eastward about 15 miles from the Detroit light and about 5 miles from the Ontario shore. Points extending to Pelee Island showed no measurable mercury.

Eastern Lake Erie, Ohio waters, concentrations of 2.0 and 2.4 mg/kg were present off-shore from mouth of the Grand River and Cleveland Harbor, respectively. Off-shore from the Cleveland Easterly sewage treatment plant, a concentration of 4.0 mg/kg occurred.

Pennsylvania waters, a concentration of 1.1 mg/kg was found in Presque Isle Bay.

Tributaries, concentrations in excess of 1.0 mg/kg were present in the Black, Ashtabula and Buffalo Rivers. In the Rouge, Huron, Maumee, Sandusky, Portage, Rocky, Cuyahoga, Grand, and Raisin Rivers, the concentrations were less than 1.0 mg/kg.

4. The waters of the study area revealed no mercury except for one sample collected at mile point 13.3 in the Trenton channel downstream from the Wyandotte Chemical Company; this concentration was 0.03 mg/l.

5. The Detroit River area is the primary source of mercury in the western end of Lake Erie. This is revealed by the distribution pattern established through sediment samples.

6. Because of mercury discharges, the State of Michigan stopped the production of chlorine by Wyandotte Chemicals Corporation until a treatment system was developed and the

mercury bearing wastes were removed from the receiving waters.

In our latest data on the 22nd of May, there appeared no discharge of mercury from that outfall.

7. The State of Ohio issued an order to the Detrex Chemical Industries, Inc., Ashtabula, Ohio on April 13, 1970, to "..cease and desist the discharge of liquid industrial waste containing any mercurial compounds to waters of the State." Some operational changes were made but data collected on May 11, 1970, indicate that Detrex still discharged 1.2 pounds of mercury per day.

8. Allied Chemical Company, Buffalo Dye Division, Buffalo, New York, is a source of mercury to the Buffalo River. On May 8, 1970, a sample of the plant effluent revealed 0.12 mg/l mercury. The company stated that the process utilizing mercury was not in use on that day. Based on this information, Allied Chemical Company was discharging approximately 4 pounds of mercury per day from sources other than the reported production of disulfo intermediates.

9. The discharge from Diamond Shamrock, Painesville, Ohio, to the Grand River had a concentration of 0.010 mg/l mercury on April 4, 1970.

10. The first statement has to be changed. Recently received data revealed that concentrations of 0.002 mg/l occurred at the Ann Arbor, Wayne County, Wyandotte and

Detroit sewage treatment plants. These were all on 24-hour composites on the 14th of May.

No measurable concentration of mercury was present in sewage treatment plant effluents investigated in Michigan (State data). Concentrations of 0.003 and 0.004 mg/l mercury were present in Euclid and Cleveland Westerly and Southerly sewage treatment plant effluents, respectively. Although no measurable concentration of mercury was present in the Cleveland Easterly sewage treatment plant effluent, which receives wastes from several users of mercury, 4 mg/kg were present in Lake Erie sediments 100 feet north of the discharge point.

11. On May 7, 1970, a concentration of 0.011 mg/l mercury was present in the outfall from the National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio. This occurred during a period when there was no discharge from lagoons that supposedly receive all mercury wastes from known sources.

12. Investigations of additional potential dischargers of mercury to Lake Erie are in progress by the State and the Federal Water Quality Administration.

Recommendations.

1. Surveillance and sampling programs be initiated by industries, municipalities, States and the Federal Government to locate and identify all sources or potential sources of

mercury and to determine mercury concentrations in surface waters, land run-off, waste streams, aquatic life, and sediments.

2. All dischargers of mercury to surface or ground waters or to municipal or regional waste treatment plants, including Federal installations, be ordered to cease and desist.

3. Precautionary measures be taken by all users and possessors of mercury or mercurial compounds for any purpose to prevent accidental spills or other losses to the water environment.

That concludes my statement.

MR. STEIN: Thank you, Mr. Van Den Berg.

Are there any comments or questions?

Mr. Purdy.

MR. PURDY: First, I would like to have you repeat the insert that you put in between 9 and 10 on page 5. I didn't quite catch that. I think you inserted some additional data.

MR. VAN DEN BERG: Yes. In the beginning of 10.

Recently received data revealed concentrations of 0.002 mg/l in Ann Arbor, Wayne County, Wyandotte and Detroit sewage treatment plants. This was based on a 24-hour composite collected on May 14, 1970.

MR.PURDY: On page 1, when you are presenting the data from the Bureau of Commercial Fisheries on concentrations of mercury in the edible portion of fish, is that data that has been supplied or collected only by the Bureau of Commercial Fisheries or is this now a summary of all the data that is available on mercury content, including that of Michigan Department of Agriculture, Ohio's data and Ontario's data?

MR. VAN DEN BERG: That's just Bureau of Commercial Fisheries data from Ann Arbor.

MR. PURDY: So really there is a great deal more.

MR. VAN DEN BERG: There is a great deal more information available if we can get our hands on it.

MR. SEEBALD: Is this data on individual fish?

MR. VAN DEN BERG: In Appendix IV, the tables from BCF indicate the number of fish that were analyzed in these samples. And this varied depending on the type of fish. Some of them were 8, 9, some of them were much larger numbers.

MR. PURDY: In sample preparations, Mr. Seebald, they sometimes take 10 fish and grind them up together and make one sample out of that.

MR. SEEBALD: I am puzzled because it gives a range in some cases and specific numbers in other cases which lead me to believe either they were a single batch or in other cases a number of batches.

MR. VAN DEN BERG: There is a Footnote #4 on page 91 that explains those ranges. They have an average value there, but they also give a range. The average value is on 6 individual samples in that particular case.

MR. POOLE: This is off that point, but on page 8, the second paragraph where you say 500 parts per billion or 5 ppm in pickerel, which is it?

MR. VAN DEN BERG: Mr. Mayo, can you clarify that? That information came from your office.

MR. POOLE: Well, I think your table on page 1 would show that it is above 500 parts per billion.

MR. STEIN: It is just straight arithmetic. One of those figures has to be wrong.

MR. POOLE: All I am trying to find out is whether you have as much as 5 ppm in fish.

MR. VAN DEN BERG: I can't clarify that.

MR. STEIN: Let's go on, and we will try to pick that up.

MR. PURDY: I have some other questions, Mr. Stein.

MR. STEIN: Go ahead.

MR. PURDY: I am wondering if you would venture to make a statement on what you might find in the way of mercury content of the bottom that had not been contaminated from some man-made source.

MR. VAN DEN BERG: No, I wouldn't make a statement on that.

MR. PURDY: Wouldn't you expect to find something?

MR. VAN DEN BERG: I would expect to find some in certain areas, yes, sir. What level, I don't know.

MR. PURDY: I have another comment on this matter of Detrex down the Ohio, Ashtabula, Ohio, apparently. Yet, in the midpoint of May, it is discharging 1.2 pounds.

I was able to read in the newspaper by George Rhodes with respect to what took place in Michigan. Apparently he has not been quite as concerned about mercury that arises in Ohio being discharged in Michigan.

MR. POOLE: It is farther south. It is not as damaging.

MR. PURDY: You mentioned about the Lewis Research Center, a certain concentration of mercury, and there was no discharge from lagoons that receive all mercury waste from known sources. What would the level be if there is a discharge from the lagoons?

MR. VAN DEN BERG: I took some water samples or George did from the lagoon, and the water itself in the lagoon didn't show any mercury.

MR. HARLOW: Mr. Purdy, in regard to that statement on page 6 in connection with NASA, at the time that we took the initial sample on May 7 when we had 11 parts per billion, the lagoon was not discharging. But the ditch that enters Rocky River which receives a number of storm connections from other sources measured 11 parts per billion. And you could guess here where it might have come from. It might have been residual in the muds, or it could have come from another source.

So we went back at two different times subsequent to that and sampled the lagoon when it was discharging, sampled the water in the lagoon, and also sampled the final ditch that carries the storm water. And on these other two occasions, we didn't find any mercury at all.

MR. LYON: You mean there was no mercury in the lagoon?

MR. HARLOW: No.

MR. STEIN: Are there any others?

MR. PURDY: On page 9, several statements are made with respect to the fate of mercury discharge to the waters and then what happens when they accumulate in bottom muds. And there is the one about they are available to aquatic life and that they are readily released from the sediments in the water and that fish absorb the mercury from the water through the gills and possibly the scales.

We have been doing a great deal of research of the literature in the past several weeks to attempt to determine the fate of mercury. And I am wondering if at some later point in time you could furnish to us the references from which this information came.

MR. VAN DEN BERG: Certainly.

MR. PURDY: Then, on page 11, there is the pernicious reference to a report by N. A. Smart, "Use and Residues of Mercury Compounds in Agriculture," to the effect that it raises the spectre of paper mills being a source of mercury today. And I am wondering if you know what period of time this particular author was talking about in his report.

MR. VAN DEN BERG: I refer that question to Mr. Muir from our office in Cincinnati.

Can you answer that, Larry?

MR. MUIR: Mr. Purdy and Mr. Chairman, this information carried from 1964 up through 1967 and probably into 1968. In 1966, I believe, the Swedish Government banned the use of these materials. And much of this original statement stated that Norway, Sweden, United States and Canada were shipping pulp from their forests internationally, and it contained up to 20 ppm phenyl mercury acetate.

MR. PURDY: From U. S. sources also?

MR. MUIR: This includes United States as being shipped, as I understand it, from our south coast or from the Texas, Louisiana, Mississippi and Florida areas to Europe. And this material contained the phenyl mercury acetates.

MR. PURDY: Why I am curious about this is the presence of mercury now from paper mill discharges is not something that we are experiencing here in Michigan. And in fact, I think about 1959, the Food and Drug Administration banned the use of phenyl mercury acetate as a slimocide in paper mills where the paper came in contact with food products. And as a general rule, the paper mills have discontinued the use of this.

In fact, we have found none being used in Michigan paper mills. And in fact, the industry indicates that this is pretty much the situation throughout the United States -- somewhat different, then, from what this reference seems to indicate.

MR. MUIR: As I say, this was up through 1968.

MR. PURDY: Well, the ban issued by the Food and Drug Administration was in 1959.

MR. VAN DEN BERG: Mr. Purdy, do your paper mills in Michigan utilize imported pulp that is transported for long distances?

MR. PURDY: There is pulp that has been purchased from Canadian sources and other sources transported quite some distance. We have sampled this, and we are not finding mercury present in significant quantities.

MR. STEIN: I think Mr. Purdy has a good point there because I have been asked that question several times before I came out here and was waiting on the report. I think if we are going to proceed with the mercury investigation, we should do this pretty rapidly, get in touch with the Pulp and Paper Trade Association in New York -- and maybe there is a representative here, but I doubt it; I don't see him -- and ask how many mills are using this in the United States, what the prevalence is, and whether we are getting any pulp from other places that we are processing.

Because the question that comes up -- and I think Mr. Purdy asked this in Michigan -- how many pulp and paper mills use mercury in their process for slime control. And I think we are going to have to have an answer to that.

MR. VAN DEN BERG: I hope, Mr. Stein, that information is being collected by our Regional Offices for submission for the national report.

MR. STEIN: Well, I don't know. You can short-circuit that, you see. When you have a question raised, you could find that the trade association of the pulp and paper industry is very knowledgeable on this. And they always give out accurate information. So we may try to get that and see how that checks against our regional submissions.

MR. MAYO: A point that might be kept in mind, Mr. Chairman, is I understand the FDA regulations apply to the pulps that are used best domestically for packaging materials that come in contact with food. In the waste pulp that was being shipped overseas for later use overseas in the manufacture of paper and packaging materials, the FDA regulations may not apply.

MR. STEIN: I recognize that. That's why I am asking for a nose count. Because obviously, they are not banning the phenyl mercury acetate in all paper mills or in all processes. This is not what the Food and Drug ban goes to.

The question that we have to ask is, in fact, how many paper mills are using the mercury. Some judgment must be made on that. Because on your previous page, you get the thousands of pounds estimate.

MR. VAN DEN BERG: Those thousands of pounds estimates come from the Bureau of Mines Mineral Year Book.

MR. PURDY: Is that consumption in the U. S. or worldwide?

MR. VAN DEN BERG: That's in the U. S.

MR. STEIN: Again, Mr. Purdy, if we take this at its face value -- and I don't want to spin this out too far -- but if you look at industrial uses in the U. S. in 1968, the Food and Drug ban was in existence since 1959. We have for pulp and paper uses 31,000 pounds.

When I first saw this and read this, Mr. Van Den Berg, I thought pulp and paper wound up pretty low on the list. This may be the reason for it. It may not be extensively used or used in wide areas.

MR. PURDY: It is used for other purposes in paper mills.

MR. STEIN: In some.

MR. PURDY: Some on the face of clocks, paper used in clocks. Some of it is used in paper that goes into wrapping of soap bars and so forth.

MR. LYON: I understand its use as a slimocide was stopped some considerable time ago. For example, Hammermill Paper used mercurial compounds as slimocides about 10 years ago.

MR. PURDY: On page 44, there is this matter of the toxic metals in bottom muds can be made available to the overlying water by physical, chemical or biological means. I have gone through how they say possibly mercury might be made available to the overlying waters. I am wondering if you could describe to me how this might take place by other means. Is it something that we would reasonably expect to happen or does it take some unusual condition for this to come out of the bottom muds and be in the overlying waters?

MR. VAN DEN BERG: I don't think it takes an unusual condition. So much of this depends on the local characteristics of the body of water.

MR. PURDY: Certainly it has got to be an unusual condition, doesn't it, if it once is precipitated into the bottom muds? There has got to be some driving force now to put that back into the overlying waters.

MR. VAN DEN BERG: Yes, sir. But these deposits that can take place during one period of the year over temperature changes, for instance, in some cases are enough to make that difference.

MR. PURDY: For what heavy metal, then, would a temperature change cause it to redissolve?

MR. VAN DEN BERG: Practically any.

MR. PURDY: To the point that it would be toxic?

MR. VAN DEN BERG: No, not necessarily to the point that it would be toxic at the concentration in the water, but if the biological life has the capability of concentrating within their bodies the toxic metal from the water, there is a possibility of buildup where levels could be significant.

MR. PURDY: Then, in the next sentence about they may reenter the water by the scouring process, when they scour, you mean they would be redissolved?

MR. VAN DEN BERG: Not necessarily. I think you probably have a good example of that in the Detroit River. At those intakes, there are bottom deposits, I am quite sure, that are picked up and moved to another area.

MR. PURDY: And in fact is more like just sediment.

MR. VAN DEN BERG: Right.

MR. PURDY: Suspended solids.

MR. VAN DEN BERG: But in the process of doing this, if you have a sludge bed that contains a metal that has been covered over so it is not available, at that time when it is scoured and transported to a different area and resettled, it again may be in a position to be within the active portion of the sludge or sediment deposit.

MR. PURDY: I think the statement is well qualified by me.

MR. SEEBALD: In the interests of accuracy, I would just like to ask the question about the reference to the measurable limit of 0.5 mg/kg as cited on page 31 and then a measurable limit on page 38 at 0.1 mg/kg.

MR. VAN DEN BERG: This data, Mr. Seebald, was developed in about three or four different laboratories. And some people are using the dithizone method which depends also on the size of the cell they use in the spectrograph. Other laboratories are using flamotoxic absorption. We use a flameless vapor atomic adsorption technique. And each has a different limit.

MR. SEEBALD: O.K. So then we don't have a uniform base on which to compare the relative levels of this mercury throughout the systems that we are talking about because of the differential analysis we have got.

MR. VAN DEN BERG: Only above certain --

MR. STEIN: What is the answer to that question? Is the answer that we don't have?

MR. VAN DEN BERG: We do in a certain range, yes. At a certain range, we do, yes. About 1 mg/kg, the data is comparable. But in the lower ranges, one guy can be --

MR. STEIN: Are these lower ranges ever significant?

MR. VAN DEN BERG: Mr. Stein, I don't think we know.

MR. STEIN: If they are significant and the fish concentrate them, you might want to consider one recommendation that we come up with a uniform method of measuring.

MR. SEEBALD: That's my point, Mr. Stein.

MR. VAN DEN BERG: This was recommended to the Administration.

MR. STEIN: Was it recommended here?

MR. VAN DEN BERG: No, I am sorry.

MR. STEIN: O.K.

Any other comments or questions?

MR. SEEBALD: Just one other one. And, again, it is a matter of accuracy. On page 39, the lower sensitivity is 0.01 mg/l.

MR. VAN DEN BERG: Yes. I am afraid I am getting mixed two people's data there, Mr. Seebald.

MR. SEEBALD: I am not being picayune. I just want to be serious about this.

MR. VAN DEN BERG: This will go into the record right.

MR. PURDY: Mr. Stein, on the insert of the data of the Ann Arbor wastewater treatment plant, the Wayne County Wyandotte plant and the Detroit wastewater plant, I have been informed that that statement is based upon information that was collected by the Michigan Water Resources Commission and based upon a report that I was just handed. And it shows of these samples, all but two have been collected on 5/14/70. And there is something wrong there because they had completed our sampling by that time. We do not have our data with us, but we do not remember having mercury present in the Detroit plant.

We would like to have the opportunity to review this data with our laboratory data back in the office and send in any corrections that may be necessary by one week.

MR. STEIN: Yes. Right. For the record -- but I do think in light of what you said, Mr. Purdy, this is developing in an area where to come up with an equitable solution, we should get the materials that are going to be presented in the workshops from the other States. Because I don't think we can ask communities in Michigan to do something without taking reference to what they are doing in the others. And maybe when that is concluded, we will be in a position for the conferees to make recommendations and come to conclusions.

But we would like to have that within a week. And I think we will go over this again because I think it is fair to say Mr. Van Den Berg is to be commended for putting together a very good report. But as you can tell from his report today and the information that I keep getting, new information on mercury is pouring in now every day. And I think we are facing a moving target here, so to speak. I think we will be in better shape in a couple of weeks.

Are there any other comments?

MR. LYON: Yes.

Mr. Van Den Berg, in an earlier report that I received prior to the conference, there is an indication that the concentrations as high as 170 ppm have been found in the discharge ditch of the Detrex Chemical plant in Ashtabula which discharged to Lake Erie. But your report -- this report, at least -- does not have any concentrations that high. Is that correct?

MR. VAN DEN BERG: I don't remember seeing a document that had that high of a concentration, Mr. Lyon.

MR. LYON: This is the report from Mr. Mayo on May 14 which was addressed to the State water pollution control agencies. On page 7 of that report, it quotes concentrations as high as 170 ppm have been found in the discharge ditch of the Detrex Chemical plant in Ashtabula.

MR. HARLOW: Mr. Lyon, this is on page 73 of Mr. Van Den Berg's report.

MR. VAN DEN BERG: It is a sediment sample.

MR. LYON: Yes, it is in the section on sediments. O.K., I didn't see that.

MR. VAN DEN BERG: 169 in this report.

MR. STEIN: Go ahead, Mr. Lyon.

MR. LYON: The next question I have is based on the investigations that you are familiar with. Is it your opinion that there are presently discharges of mercury going into Lake Erie?

MR. VAN DEN BERG: Yes.

MR. LYON: And I assume that this is what your recommendation to issue a cease and desist order is based on.

MR. STEIN: If you want to wait -- I was waiting until you were finished -- but let me give you a preview, and you can continue. If we agree that the cease and desist should be made, I have a list of names I want to call up here:

Wyandotte.

Detrex.

Allied Chemical, Buffalo Dye Division.

Diamond Shamrock.

Those Cleveland plants.

National Aeronautics and Space Administration.

We can go over them one by one later.

If there is a cease and desist -- in fact have these places stop discharging? Are they putting in mercury now? I think this is a key question. But maybe we should save that until we get all the technical questions out of the way.

MR. LYON: Well, I don't know. Do you want to wait?

MR. STEIN: No. Do you want to? If you accept an amendment, let's expand these. Let's go down and look at your list.

How about Wyandotte Chemical? Are they putting any mercury into Lake Erie now?

MR. VAN DEN BERG: No. The latest data I have is March 22. I understand there is new data since then. It still indicates no mercury discharge.

MR. STEIN: No mercury from Wyandotte now.

Detrex Chemical?

MR. PURDY: Mr. Stein, I would like to indicate that the cease and desist order has already been issued through the Circuit Court, Ingham County, State of Michigan. So that has already been accomplished.

MR. STEIN: Well, the point is I think we have some cases where cease and desist orders have come out and the indication is that there is still a discharge.

Detrex Chemical. They also have a cease and desist order issued against them. Any discharge from them?

MR. VAN DEN BERG: Yes. On May 12, they still were discharging 1.2 pounds per day.

MR. STEIN: Allied Chemical. Any discharge from the Buffalo Dye Division?

MR. VAN DEN BERG: From our data, yes. And from New York's report, I suspect they are still discharging some mercury.

MR. STEIN: All right, Diamond Shamrock, Painesville, Ohio.

MR. VAN DEN BERG: Their hydro discharge indicated 0.01 mg/l.

MR. STEIN: And you would consider that a significant discharge?

MR. VAN DEN BERG: Yes, sir.

MR. STEIN: How about those Cleveland chemical plants where you found material in the river? Do you feel they have enough of a program to prevent mercury coming through their plants and there is no problem with them any more? That is Euclid, Cleveland Westerly and Southerly, particularly the Easterly plant, where you found 4 mg in the sediments. Do you think they have a safeguard there in an industrial waste safeguard so no more mercury is going to come out?

MR. VAN DEN BERG: No, I do not.

MR. STEIN: What?

MR. VAN DEN BERG: No, I do not.

MR. STEIN: All right.

MR. HARLOW: Mr. Chairman, I can shed some light on that. A large part of the mercury that reaches the Easterly plant comes from GE Lab Division.

MR. STEIN: Has GE stopped putting that mercury into the sewer?

MR. HARLOW: GE has reported to us they have stopped the mercury from the sources.

MR. STEIN: On a voluntary basis?

MR. HARLOW: We had some meetings with them.

MR. STEIN: But there is no order against GE?

MR. HARLOW: No.

MR. STEIN: And there is no requirement against GE to stop them putting mercury in as far as you know?

MR. HARLOW: As far as I know.

MR. STEIN: Well, I don't know that we can rely on your pleasing personality all the time.

(Laughter.)

We may have to get something else.

MR. MAYO: Mr. Chairman, I might just make a comment at this point. We have a letter report from GE to Mr. Harlow dated May 27 that outlines the corrective actions that GE is in the process of making. We can submit this for the record.

MR. STEIN: All right.

(The above-referred to letter follows in its entirety.)

GENERAL ELECTRIC
COMPANY

LAMP
DIVISION

NELA PARK, CLEVELAND, OHIO 44112 . . Area Code 216 . 266-3376 . . . .

May 27, 1970

Mr. George Harlow, Director
Federal Water Quality Administration
Lake Erie Water Basin
21929 Lorain Road
Fairview Park, Ohio 44126

Dear Mr. Harlow:

In cooperation with your Messrs. Winklhofer and Kramer we have reviewed those operations in the Lamp Division of the General Electric Co., wherein elemental mercury is being used. Of the six locations visited, water samples were obtained from the Large Lamp Department Pilot Plant - Fluorescent, at Nela Park, East Cleveland, Ohio; the Bucyrus Lamp Plant, Bucyrus, Ohio; and the Chemical Products Plant, Cleveland, Ohio. Of these, samples of water were obtained at the processes themselves, but not from the plant effluent. This was done only at the Chemical Products Plant, where samples were also obtained at an outfall where the effluent was representative of that discharged into the combined sewers of the City of Cleveland.

As I have explained to your representatives, our mercury handling processes have been designed to prevent loss of mercury for both economic and pollution abatement purposes. I believe that this philosophy was amply demonstrated to them during their visit to our plants.

To place the data obtained in the proper prespective, and to describe the remedial action we have undertaken, I respectfully submit the following:

I. Large Lamp Engineering Piloting Operation:

a) The process here involves the dropping of tipped-off exhaust tubes from fluorescent lamps into a tray of water. The purpose of the water overlay is to prevent dissemination of mercury vapor from these tubes into the air of the working environment. Only one such tray is normally involved, and the water is continuously recirculated. Periodically, the exhaust tubes are removed, and the tray of water is discharged to the sanitary system. The frequency of water change is variable depending upon the build-up of phosphor powder, slime, etc. Maintenance men are instructed to slowly decant this water into the plant drain.

b) Concentrations of mercury in the sample from this tray obtained by your field representatives was 1.06 p.p.m. Our analysis was 1.02, which shows good correlation. Total water discharge from Nela Park into the city sewer is 1.3 million gallons per day. Thus, even if this tray containing about 3 gallons of water were to be discharged into the Nela Park drains over a period of 1/2 hour a day, the average concentration for this period, as the wastewaters enter the city sewer, would be about 0.1 ppb.

c) Although we believe our mercury discharge into the water system to be negligible, we have nevertheless already taken steps to completely eliminate even this small quantity by setting up a filtration and recycling system which permits continuous re-use of this tray water, without the need for bleeding into the water drains. This system is already in effect.

II. Bucyrus Lamp Plant:

a) The use of water for mercury cover here is for the same purpose as in the Pilot Plant. Nine trays are involved, each filled with about 3 gallons of standing water. The tipped-off exhaust tubes are caught in a wire-mesh basket, and over a period of 24 hours each of these baskets are removed from the water-tray, shaken, and placed over an open drum to permit drain-off. Once a day, this drain-off water is carefully decanted into a 2' x 4' stainless steel sink which has a stand-pipe with its opening about 3" from the bottom sink surface. Any mercury which may accidentally drop into the sink is collected from a special drain opening located at one end. Over-flow water leaves the stand-pipe and enters a large trapped pipe into the plant drain system.

b) A sample of water removed from a typical exhaust tube water tray showed 0.85 p.p.m. by your analysis. Total water discharged from this plant to city sewer is 300,000 gpd. Only the drain-off from these 9 trays eventually reaches the sewer lines, and the decanting procedure takes about one hour. If all the trays were discharged into the sink, over a period of one hour/24 hours, the Hg concentration would be 0.18 ppb as the waste water leaves the plant.

c) On May 15, 1970, when Mr. Winklhofer visited this plant, modifications to the stainless steel sink had already been made wherein the stand-pipe was diverted from the drain-pipe to a 30-gallon drum. This will permit continuous re-use of the water to fill the exhaust-tube trays. This system too is now in effect.

III. Chemical Products Plant:

a) The mercury discharged from this plant is from a mercury cleaning process in which the dirty mercury returned from our other plants is steeped with nitric acid. The supernatant acid is removed to a ceramic crock, as are the first several water rinses. This supernatant is treated with liquid caustic, during which time mercury is precipitated and removed. The treated supernatant and subsequent mercury rinses are discharged through a removable catch basin in a trapped floor drain to confluent with other waste water effluents from the plant.

b) Your data indicates the presence of about 153 p.p.m. of mercury in the treated supernatant, and 13.9 p.p.m. in the rinse waters prior to discharge into the plant stream. At the last outfall prior to entry into the City sewer system concentrations, as reported by your investigators, were between 0.021 and 0.037 mg./li. These discharges occur only over a 1/2-hour period at a frequency of 2-3 times a week.

c) The system of mercury cleaning at this plant is presently being changed.

1. A more dilute nitric acid will be used in the steeping operations to reduce dissolved mercury salt.
2. All final rinse waters will be treated together with the supernatant.
3. Neutralization and precipitation of mercury by liquid caustic followed by secondary precipitation with hydrogen sulfide, and
4. filtration of the liquid instead of decantation.

These additional steps are expected to effect a very marked reduction in Hg content of the discharge from this process, and may completely eliminate it. Laboratory tests appear to bear this out. These modifications will go "on-stream" starting the week of June 1, 1970.

The samples taken at our two Lamp Plants indicates that our waste-water discharge into the municipal sewerage system would never exceed the suggested maximum of 2 ppb of mercury. The steps already taken at their two plants will assure that no mercury will be discharged. It is also our belief that the remedial action being taken at our Chemical Products Plant will profoundly reduce the dissemination of the already minute quantities of mercury periodically discharged into the waste water effluents, and may completely eliminate it.

Sincerely yours,

I. Matelsky

I. Matelsky, Chairman
Division Council on Water and Air
Pollution Abatement

IM:sh

MR. STEIN: The question here is whether the city of Cleveland that GE is hooked up to in their sewer system should have a requirement against GE so they don't put something in that is a violation.

Now, how are we doing with the National Aeronautics and Space Administration? Are they still putting some stuff out, Mr. Van Den Berg?

Lewis Research Center. I guess that is a Federal installation. How about that, Mr. Harlow?

MR. HARLOW: Mr. Chairman, there is a representative in the audience -- there was a few minutes ago -- from NASA, Ed Stevenson. But I don't see him now. I guess he walked out at the wrong time.

MR. STEIN: It depends on your point of view.

You know how slick that mercury is.

MR. HARLOW: It is the NASA quitting time, I think.

MR. STEIN: Do you think they should stop putting this in?

MR. VAN DEN BERG: Yes, I do.

MR. STEIN: Mr. Gamet, do you have a program to do that at the Federal installations? I don't think I heard that in your report.

MR. GAMET: I believe they have a program. As a matter of fact, I have a letter addressed to me based on some inquiries that Mr. Harlow made of the Lewis Research Center on April 13, asking questions about any possible mercury discharges and techniques used in waste disposal and the effluents from the waste retention basin.

In addition to that, I have a copy also of sample analysis from #1 and #2 basins on April 14, 1970, indicating zero ppm of mercury. If you choose, I can introduce this.

MR. STEIN: On May 7, Mr. Van Den Berg reports he found a measurable quantity of mercury coming out.

Now, again, he has a recommendation here that all discharges, including Federal installations, be ordered to cease and desist. And we heard Ohio has a cease and desist order against Detrex. Michigan has taken a cease and desist order against Wyandotte.

And you have gone to court in Michigan.

It doesn't seem to me on the sum of what you have read that we really are talking in terms of cease and desist.

MR. GAMET: I am not saying they are lily white, believe me. This is the information I have.

I think George probably has additional information beyond what I have. I am not sure.

MR. HARLOW: They earlier stated that subsequent to that May 7, they sampled at two other times, and it was zero.

MR. LYON: Mr. Chairman, I think that recommendation regarding cease and desist orders as a whole probably ought to be expanded to the extent of not merely looking at the discharges, but asking the question what the company or installation is in fact doing with their mercury.

Now, if they have stopped the process, that is one thing. If they haven't, then we ought to find out where the mercury is going.

MR. STEIN: By the way, we did ask this question of Mr. Van Den Berg in the inventory program. That is, if we find anyone using a significant amount of mercury, we want to know what they are doing with it, how they are controlling it; and if they are not controlling it, what their program is to control it, with the date. If that isn't satisfactory, get them to come up with a remedial program.

Now, I think this is the kind of thing we are going to need with the National Aeronautics and Space Administration. I think Mr. Harlow got that from General Electric and Cleveland -- the program for containment. But I don't think we have it for the National Aeronautics and Space Administration -- the program of what exactly they are doing with their mercury and how they are containing it.

MR. HARLOW: Well, I don't know exactly what all the sources of mercury at Lewis Research center are, except that the recent samples confirmed what they said, "no mercury discharge."

MR. STEIN: I understand.

Let's get back to Mr. Lyon's suggestion. And that is exactly, Walter, what we have proposed. The point is if we have an in-and-out situation in April of zero, and you come in early May and get a measurable amount, and in late May zero again, it seems to me this is exactly the kind of situation where we ask them what their sources are, what they are doing with it, and what they are doing to contain it.

Now, can we get that from these people?

MR. LYON: I think to clarify this point, what we need is a complete mercury balance indicating what is coming in, what is happening to it, and how is it leaving the plant so that we can get a complete balance on the mercury everyplace where mercury is being used.

MR. STEIN: This is what we are seeking to get from every significant source in that survey that Mr. Van Den Berg is working on now. I would suggest that particularly the way to get at this National Aeronautics and Space problem is to obtain such a mercury balance, because it looks as if we have an intermittent discharge problem.

Is it possible, Mr. Gamet, that you could get that?

MR. GAMET: Yes, I am sure we can get it.

Would you care to have me read the letter?

MR. STEIN: No, just put it in the record.

(The above-referred to letter follows in its entirety.)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LEWIS RESEARCH CENTER
21000 BROOKPARK ROAD
CLEVELAND OHIO 44135
TELEPHONE 433 4000 TWX CV-520

IN REPLY REFER TO 1006

APR 24 1970

Regional Director, Great Lakes Region
Department of Interior, FWPCA
33 East Congress Parkway
Chicago, Illinois 60605

Attention: Mr. Merrill B. Gamet
Federal Activities Coordinator

Dear Sir:

Subject: Mercury Control Program at NASA-Lewis Research Center

On April 13, 1970, Mr. George L. Harlow, Director, Lake Erie Basin Office, FWPCA, contacted Mr. E. F. Stevenson of the Safety Office in regards to mercury usage at Lewis Research Center. The following information was requested.

1. Does Lewis use mercury in its Cleveland - Plum Brook facilities?

   Mr. Harlow was advised that mercury is used principally in the liquid metal form in research instruments and in ion engine thrusters for space engine research.

2. What quantities are used annually and what procurement replacements occurred this past year?

   A semi-annual inventory and report is prepared by the Equipment and Supply Division for the combined facilities at Cleveland and Plum Brook. Copies of the reports for 1969 dated September 9, 1969 and the January 5, 1970, Recapitulation of Mercury Inventory are attached. The declared losses are the result of plating out of mercury vapors on chamber cold walls and baffles. Unexplained losses include mercury accumulation in vacuum pump oil reservoirs, vaporized mercury vented to atmosphere through exhaust pump discharge, and portions of accidental spill material which is not recovered. No new mercury was procured in 1969.

3. What technique is used in waste disposal?

Due to the critical value of this material, it has been the policy at Lewis Research Center to reclaim all contaminated or used mercury. No mercury is discharged into any sewer system. Accidental spills are vacuumed with special vacuum cleaners that trap condensed vapors and droplets for reclaim. Wet mop water after vacuum operations is discharged into the sanitary sewer.

4. Is the effluent from the industrial waste retention basin sampled for mercury before discharging into Rocky River?

Mercury is not deposited in the storm or industrial waste system. Since the Cleveland Metropolitan Park Board Resolution does not require sampling for mercury, sampling has not been done in the past. However, in the interest of a cooperative investigation, these basins were sampled April 13, 1970 and April 14, 1970, according to the procedure suggested by the Lake Erie Basin Office. Using the Dimethyzol Stripping Method, the analyses indicated zero ppm of mercury concentration for both tests. A copy of the Analysis Report is attached.

If we can be of further assistance in any way to the FWPCA Regional or Basin Offices with additional data or technical advice, please do not hesitate to let us know.

Sincerely yours,

Bruce T. Lundin
Director

Enclosures 5

cc:
G. L. Harlow, Director
Lake Erie Basin Office, FWPCA

ANALYTICAL CHEMISTRY

ANALYSIS REQUEST AND REPORT

This space to be completed by analytical section:

Sample No(s).: 2

Date completed: 4/14/70
Date reported: 4/14/70

This space to be completed by person desiring analysis:

Name: ED. STEVENSON
PAX: 3279
Date submitted: 4/13/70
Date report desired: A.S.A.P.
J. O. P001006

Description of material to be analyzed and analysis desired:

INDUSTRIAL WASTE WATER SAMPLES for MERCURY CONTENT.

Analysis report:

Sample	DATE	ppm Hg
#2 BASIN	4/13/70	0
#1 BASIN	4/14/70	0

NOTE! SENSITIVITY of METHOD IS 0.01 ppm Hg.
THIS METHOD ^was^ STANDARDIZED FROM 0 to 0.5 ppm Hg

D. E. Kuivinen

C.832 (8/3/54)

Reproduced from best available copy.

MR. SEEBALD: Mr. Stein, I think we should consider where this mercury may be going in the wastes. If we remove it from the Lake Erie environment and we are going to put it in a deep well or put it in a sludge bed that might reach out into groundwaters or other surface waters is of material significance. And I think the practicality of a cease and desist order to the environment may be considered completely unfeasible in sort of shutting down the complete industry.

MR. LYON: Mr. Chairman, I think there shouldn't be any question about shutting down a process if there is anything going to Lake Erie.

MR. SEEBALD: I don't think we should talk about Lake Erie in this case. We should talk about the environment.

MR. STEIN: I think you talked about surface and other ground waters. And as a matter of fact, in large measure, as I understand it, that is what Michigan did with the portion of Wyandotte Chemical that was using this process. They just shut down. And that is what Detrex did in large measure. It was either switch the process or shut down.

And I do agree with your point that in the same way as we deal with this, we don't consider a satisfactory solution to water pollution to be contamination of the air, contamination of the ground or something else. But the recommendation here is that all discharges of mercury into the area over which we have jurisdiction -- that is, the waters -- be stopped forthwith.

I think several of the States have indicated that they have taken this action.

MR. SEEBALD: We have taken this action, but it is just fortunate in our case it is Allied Chemical Dye Works which is a batch process. They have shut down their dye process manufacture. And it is only by shutting down can they achieve it.

I am more concerned in generalities with these continuing chlor-alkali plants who have also provided us in New York State with schedules for reduction, but not elimination. And I think this may be a matter for further consideration, not for New York State at the present time, but for the other States where they would have continuing process runs.

MR. STEIN: You mean we are going to let a little bit of mercury come out of these plants?

MR. SEEBALD: I don't intend to let a little bit of mercury come out.

MR. STEIN: What does the reduction process mean?

Are we going to do it over a period of time?

MR. SEEBALD: We asked for a process of elimination.

MR. STEIN: Over a period of time?

MR. SEEBALD: Yes.

MR. STEIN: Like you run down phenols and stuff like that?

MR. SEEBALD: I think we are faced with this.

MR. STEIN: All right, that is a proposal.

MR. LYON: Mr. Chairman, I want to make Pennsylvania's position very clear on this thing. And it is our very strong feeling that if any plant that has been reported or has been discharging to Lake Erie doesn't stop within the next week, I think we as conferees should recommend that a Federal injunction be issued against those plants.

MR. SEEBALD: How many plants do you have, Walter?

MR. LYON: How many plants do we have that are discharging mercury? None. But we are being affected by the mercury.

MR. STEIN: I have got this list here, Walt. I will be glad to refer these cases to the Department of Justice if you don't think they are stopped within a week.

As far as I can see, of the ones that I read on the list here, perhaps Euclid at least, Cleveland and GE have stopped perhaps. And I don't know that the National Aeronautics and Space Agency has stopped. We have got a big question mark there. Wyandotte, we know has stopped. This leaves us with indicated reports of mercury coming out from Detrex Chemical, Allied Chemical, Buffalo Division, Buffalo, Diamond Shamrock and possibly National Aeronautics and Space.

And if your proposal is unless they are all stopped within a week the conferees recommend that we take appropriate Federal legal action, I would be happy to take that judgment back.

MR. LYON: That's our proposal, Mr. Chairman.

I don't know whether the subject of the toxicity of mercury and its effect on man has been given enough discussion here, but I would like to just for the record read what was in the Federal report concerning methyl and ethyl mercury poisoning. I am aware of the fact that not all of these mercury contaminations take that form, but I suspect that some of it does. And it also depends naturally on the concentrations, but we have found some high concentrations.

The symptomatology of acute and chronic poisoning from both compounds is similar, including numbness and tingling of the lips and hands and feet, ataxia, disturbances of speech, concentric obstruction of the visual fields, impairment of hearing, emotional disturbances, with severe intoxication. The symptoms are irreversible.

And I think this is the important point that this material accumulates in the tissues of man and animals.

This is the first epidemic. And then it goes into the Japanese epidemic.

But the point is we are dealing with a very, very toxic substance. And I think it is essential that if these dischargers are not stopped, if the State courts are not enforcing these discharges, then the Federal Government should take appropriate action.

MR. STEIN: I don't want to modify your motion specifically, but why don't you make it appropriate legal action?

MR. LYON: Appropriate legal action to stop the discharge.

MR. STEIN: Well, I don't know. What do you think of that proposal?

MR. PURDY: As I have understood in the past, Mr. Stein, this hasn't been the sort of thing where you have a motion and a seconder and a vote and so forth.

MR. STEIN: That's right. We are just looking for an expression of views if anyone wants to give any.

MR. PURDY: Certainly we believe it is only fair to our industries, to our Governor in his State address to the President, that Michigan has taken aggressive action now to cause the mercury discharges from its plants to be stopped. And to be fair to our industry, he feels that the same sort of action should be taken throughout the country, not only in the Lake Erie Basin, but throughout all 50 States.

Certainly, past statements by the Governor and by our Commission would support aggressive action to stop immediately those discharges of mercury to the water that cause harmful conditions.

MR. STEIN: How about you, Mr. Poole?

MR. POOLE: Well, I think I would share that view. I have been keeping pretty quiet because we are in the same position at the moment, at least, as far as Lake Erie is concerned as Pennsylvania is. It is pretty easy if you don't know of any to say everybody else ought to stop immediately. But I think all known sources in view of the things that have come out here today and earlier ought to be stopped immediately.

MR. STEIN: O.K. Now, we have got over the two easy ones. Would you care to make a statement for the Federal installations? Could we adopt the same policy to try to get rapid action for Federal cleanup?

MR. MAYO: Certainly, the substance of the recent Executive Orders is such that there should be no question that we can approach NASA installation at the Lewis Research Center and advise them of the findings, advise them of the sense of feeling of the conferees, and the need for the installation --

MR. STEIN: Would you have any objection to this: Within a week, in line with this proposal, you have a report from that NASA facility so that we either have assurances that everyone is satisfied that they have accounted for the balance of the mercury and there will be no further discharges or we will take appropriate action through the Executive establishment. I will recommend that they be directed to stop if you haven't reported that they have a satisfactory program.

MR. MAYO: We will contact the installation immediately.

MR. STEIN: All right, if you want to do that.

Now, we come to the two hard States because the Federal Government may add this, but it isn't our agency, either, we are dealing with. Michigan has got to clean up. There are no known sources or significant sources in Indiana and Pennsylvania. Ohio isn't here to speak.

MR. VAN DEN BERG: They said I could speak for them.

(Laughter.)

MR. STEIN: You know, there were once a couple of political figures like that. One guy made some remark, and the other guy said, "You know, everyone is privileged to be stupid, but this guy abuses the privilege." Let's not abuse that proxy.

I don't want to put you on the spot in New York, but do you care to comment or not?

MR. SEEBALD: Yes As far as I am concerned, as it affects Lake Erie, there is no problem in cease and desist order against Allied Chemical Dye Works because they have stopped. And they have entered a commitment they would not commence using mercury in their dye processing until they had a review of their application presently before us that was scheduled to minimize. And we have not rendered an opinion on this.

It is our intention to have them indicate why they cannot and have this go through ar appropriate evidence for presentation. And it is the inclination of the State right now to cause them to cease.

MR. STEIN: But may I say I think, Mr. Seebald, again on this one, I wish if there is any doubt about the facts here that you give this one priority. Either they have ceased discharging mercury or they haven't ceased discharging mercury. This is a fact. On May 8, presumably Mr. Van Den Berg has some information which caused him to say that they were still discharging mercury. If, in fact, they have stopped and this isn't occurring, I wonder if you and Mr. Van Den Berg could get together, have your representatives make a visit there, and come up with the facts.

If they have stopped using mercury, they shouldn't have any coming out unless there is a residue that is washing out that you know of.

MR. SEEBALD: That's the one reservation I have. I think that may be the case. I don't know.

MR. STEIN: If that is the case, let's find out what the facts are so we know where to move. But I think if this is the case, unless you can resolve the factual issue, this seems to be crying for inspection pretty soon. So the Federal and State people should get together and know where we stand on this so we won't be bugging you for a cease and desist order when in fact they may have stopped.

MR. SEEBALD: It is my impression that they have.

I would like to ask Mr. Mayo, haven't you a man on assignment to the Buffalo Regional Office at the present time? Or has he been reassigned? Is Mr. Wilcox not there any longer?

MR. MAYO: We don't have anyone at Buffalo any longer.

MR. SEEBALD: Wilcox was there on the occasion you made this one inspection, I know.

MR. HARLOW: Wayne Wilcox came up at the same time to check on the compliance and status of all your city industries. While he was there, he accompanied Violanti to the Allied Chemical plant.

MR. SEEBALD: Is that the sampling on which you predicate this?

MR. HARLOW: Yes.

MR. SEEBALD: I understood he was there at the present time. I didn't know how long he was going to be there.

MR. HARLOW: He came right back to Cleveland.

MR. SEEBALD: We would be glad to sample.

MR. STEIN: Let me ask another question. And I ask this here really just for getting information. I see no recommendation here made to get up the mercury that is in the sediment. Maybe we should or shouldn't. Maybe the thrust of the questions asked by Mr. Purdy meant it is just going to stay there.

But if you are talking about the fairly large quantities of mercury which have been discharged and if you have a fairly discrete area which you pretty accurately defined for Wyandotte Chemical, do you think that is all right to leave that there? Or should we do anything about that or direct our attention to that?

Again, I have absolutely no preconceived notion of this. But I think we have, at least to my mind, something which raises the question in your report and we may get questioned about. I hate to leave a loose end.

MR. VAN DEN BERG: This area, Mr. Stein, is something that takes a considerable amount of thought. If there is high mercury in the sediments, we may very well cause more problems by trying to dredge it out than by leaving it where it is set if it is covered in the sediments and will not be disturbed.

The first point I think we have to look at is when the mercury discharges are discontinued, then follow whether or not there is a corresponding decrease in the levels in fish and aquatic life. If this happens after discharges are stopped, I would see very little reason to dredge sediments to remove mercury.

MR. STEIN: Let me try to rephrase what I think I understood you to say. You say your present thinking is to leave the sediments there and check the concentrations of mercury in the fish in Lake Erie. If these mercury concentrations go down, leave well enough alone. If the mercury concentrations remain at high level and you find a causal relationship that may be related to the sediments, then we will think about disturbing those sediments. Is that a fair statement?

MR. VAN DEN BERG: Yes.

MR. LYON: Mr. Chairman, isn't there one other point in this connection that should be considered? And that is we ought to, as Mr. Van Den Berg has suggested, monitor these to see what is happening. But if some of these deposits are in areas where dredging is contemplated, this is where I would feel quite fearful as to what might happen. And, therefore, we really ought to take your suggestion one point further and maybe make sure that there wouldn't be any dredging in that area or make some special plans if there is a plan for dredging in that area. Because if those mucks get dredged up and put someplace else, I think we are going to have a problem.

MR. VAN DEN BERG: I would refer your comment to Mr. Mayo on that since I think he is involved in a discussion right now concerning dredging.

MR. MAYO: Among some of the most recent information that Mr. Van Den Berg included in the revised material

I believe is some data for Lake St. Clair and the occurrence of mercury in rich sediments in the upper part of the Trenton channel in Lake St. Clair. And we were advised the latter part of last week that the Corps anticipates a dredging project this year in that portion of the Trenton channel and that the normal procedure has been to dispose of those dredgings over to the side of the channel in the waters of Lake St. Clair.

This is the problem that the conferees need to address themselves to. And I think it is correctly related to the observation that Mr. Lyon just made.

MR. PURDY: The problem is we have got the geography twisted to some extent, I think. The Trenton channel is not up in Lake St. Clair.

MR. MAYO: The ship channel in Lake St. Clair.

MR. PURDY: We are not talking about the Trenton channel. We are talking about the shipping channel in Lake St. Clair.

MR. MAYO: The upper end of Lake St. Clair.

MR. STEIN: Is the Corps going to go ahead unless we do something?

MR. MAYO: The Corps has asked for comments, and we are obliged now to respond. And we have not responded, choosing to have the issue raised here with the conferees.

MR. STEIN: All right. Do you think we can prepare our comment now?

I don't know how soon the Corps needs a comment. Do you think you and Michigan, talking about the Federal Government and Michigan, should get together and prepare a statement on that? Can you do that within a week for consideration of the conferees? Because I hate to let the Corps get revved up. You know, you are not going to stop them unless you have enough leadtime if you feel that is what you want to do.

MR. MAYO: The Corps has indicated to us there can be a modest postponement of the dredging operation in order to give us an opportunity to respond.

I am sure we can get together with Mr. Purdy within the next week.

MR. STEIN: All right. Maybe some of my friends from the Corps are here. I don't want you to be restricted that way. As far as I am concerned, if you don't think those muds should be disturbed, I am not worried about any modest postponement, we will just stop it.

MR. MAYO: Well, that wasn't the context in which I offered the comment.

MR. STEIN: Well, I know. But I think you should get the full gamut of this.

One, whether these muds should be disturbed at all.

Two, if they are disturbed, what precautions should be taken as to where the soil is placed.

Is that a fair thing? But I would like to have the Federal conferee and the State of Michigan take a look. I think if we are going to make any meaningful push on that, we should have a joint report, if possible, with a recommendation on this dredging, signed by Michigan and our Regional Office, in about a week, so we can get some signal on how we are going to move.

After I clear the decks in Washington, I would hope we would be able to arrange this to allow the Region to take the initiative with the District Office and the Corps here, and handle it on this level rather than letting it get back to Washington if we can.

O.K., is that agreeable?

MR. PURDY: I am not prepared to comment on this now, since it was first brought to my attention yesterday. We are in agreement to meet with Mr. Mayo and discuss a joint position.

MR. STEIN: Are there any other comments or questions on that mercury problem or any other point?

MR. POOLE: I have two questions.

I got the impression from listening to Mr. Van Den Berg if you get different results with different analytical methods, I would like to suggest to him that FWQA decide which is the best analytical method and immediately supply that to at least all of the States that are represented here.

MR. VAN DEN BERG: I am afraid if we do that, Blucher, somebody would not be able to afford it.

MR. POOLE: Afraid what?

MR. VAN DEN BERG: Some people may not be able to afford it.

MR. POOLE: Can we send the samples to you, then?

MR. VAN DEN BERG: A lot of people have been doing that if you have problems.

MR. POOLE: Isn't this really a problem yet?

MR. VAN DEN BERG: Yes. There are some limitations in the analytical procedures, but at the present time we are using the best method and equipment that the individual laboratories have available. Unfortunately, we are not all equally equipped.

MR. POOLE: You are dealing in very small quantities here. And I think this can be a pretty important item.

Well, you do the best for us, then, supply us with various methods.

MR. STEIN: Let's try to get at this if we can because, again, I think the best method means the best practical method you can expect the State to use. Are you saying if you get down to 1 ppm?

MR. VAN DEN BERG: We get down to 1 ppb.

MR. STEIN: By what kind of method? Can everyone use a reasonably accurate method that isn't too costly down to 1 ppm?

MR. VAN DEN BERG: No.

MR. STEIN: They can't?

MR. VAN DEN BERG: The dithizone method which is the one I am aware of -- Larry maybe can expand on this -- but at least the ones I am aware of, without going to atomic adsorption unit, you cannot get down to 1 ppb. And this has to be with a flameless vapor technique on the atomic adsorption.

MR. STEIN: Is that one part per million or billion?

MR. VAN DEN BERG: One part per billion in water.

MR. POOLE: This has a bearing on my second comment or question, Mr. Chairman. And that is you report 3 and 4 ppb in two of the Cleveland plants. And we have had an explanation here for the Easterly plant that apparently somebody, at least, has found some in three or four of the Michigan sewage treatment plants.

If you turn to page 10 and look at that list of mercury users and you get down past item 4, I am assuming that a great many of these users that are tabulated in the lower half of the table are hooked onto municipal sewer systems.

I for one--and I will freely admit to being the most ignorant one up here at this table as far as mercury contamination is concerned--wonder if we aren't obligated to start looking at least at some of our major sewage treatment plants.

And the second wonderment I have is: Are we going to try to shut off every drop of mercury from getting into a stream or a lake? Or can we end up with a tolerable limit?

I don't expect you to answer all that today, but I would like to have your opinion.

MR. VAN DEN BERG: Every drop of mercury being removed from a waste treatment plant, for instance, is almost an impossibility unless we outlaw the use of mercury in pharmaceuticals. And they are uncontrollable.

But my idea in the recommendation was that the industries themselves, the users of mercury themselves, should be responsible to take the mercury out before it reaches a municipal system.

MR. POOLE: That is a beautiful theory, but I have had some experience with laboratories since we operate a fairly sizable laboratory and we are on the IU Medical School campus. And they operate a lot of laboratories. And there are just a hell of a lot of things that happen in some of these research laboratories that ought not happen, but they do. This troubles me.

MR. VAN DEN BERG: Accidental spills in laboratories is something that is extremely difficult to do anything about.

MR. STEIN: I don't know. It may be difficult to do anything about, but it is not impossible because we have had places with accident spills where we have been plagued by that in industrial plants. And they have taken action to do this. They have got warning systems, they have traps, baffles around the drains in the floor that will stop this.

The point is this gets to be a big problem. And industry has solved this problem again and again.

And I appreciate what Mr. Poole is saying. This has been true for years. You talk about these wonderful tolerances in the research laboratories, and I wonder. I just raise this. I wonder if their housekeeping methods in handling their wastes are as good as we expect from most of the industry.

MR. VAN DEN BERG: Probably not as good as the research. There were plants that were reported in this one. There is an instrument plant, for instance, that installs a floor drain in any room where mercury is used.

MR. POOLE: I am kind of leading up to this because this has been Indiana's policy for 10 years now on cyanide. And apparently mercury is just as bad or worse than cyanide except the quantities are a little different. And I am wondering if before you get through this we won't need to think about setting up the same kind of procedures with users that you have for spills and decontamination of radioactive materials. This is what is going through my head.

MR. VAN DEN BERG: It is possible.

MR. POOLE: I don't know. Maybe .003 of a part per billion in Cleveland sewage plant or Fort Wayne sewage plant is of no consequence. I don't know.

MR. STEIN: I think we have got two points that I am pretty sure we are going to have to answer. One is if we are looking for the so-called zero tolerance because, you know, what happens there when you say no measurable limit. Three months from now, some bright young guy is going to come up with a method that is going to measure the stuff that you are finding no measurable limit on now. And if this is hot enough three months from then, someone is going to come up with something you can measure in parts per trillion. And we will be off and running. So if you mean

L. A. Van Den Berg

every trace of this that we are ever going to find, we have one thing.

Now, if you are going below parts per billion or down to a part per billion, as you are, and we are dealing with this mercury, we have to come to this conclusion, it seems to me, if we are going ahead with this program. Either we are coming up with a standard method that we can give to the States, municipalities and industries where they can reasonably get reliable results that we all can base our program on, or else we are going to have to set up facilities ourselves. Whether you use atomic absorption, gas chromatography, or whatever, we are going to have to set up facilities ourselves and accept these samples and do the work ourselves, or else contract with some laboratories that have these fancy machines.

Again, we must choose between one or the other. Although these are very proper questions, unless we do that, in delivering any technical report, we are going to have this same series of questions on these discrepancies in the number. Exactly what does a little trace of this mean in a sewer pipe or sewer system?

I think we just have to come to grips with those problems, work our way through and come up with recommendations. Otherwise, we are going to have a mercury problem.

And let me make one last remark on this. We, and I think I particularly, have given thought to this mercury problem, but they are talking about all toxic materials. If we can't do this on mercury, which is a relatively easy one, what are we going to do on the others? That's why I say I think we should look at this as kind of a pilot operation in dealing with the whole area of control of toxic materials, and see if we can come up with a reasonable program that we can live with, and the States can live with, and the users of mercury can live with.

MR. LYON: Mr. Chairman, I would like to comment on this. This touches on one of the items we talked about yesterday morning regarding the whole question of toxic substances. You remember, Murray, an old colleague of ours, Morris Ettinger, used to point out most sewage treatment plants provide cosmetic treatment. It makes things look better. But we are finding increasingly that sewage treatment plants in many cases are discharging toxic effluents because of industrial wastes and other substances that are discharged to them. And this is probably equally true in the case of certain industrial wastes as we have just found out in the case of mercury.

The history of points of view by scientists, as I said earlier -- Rachel Carson[*] on this -- goes back to Mark Hollis[**] and later congressional committees and policy advisory committees at the Federal level. Whether you read the report of the Tukey Committee[***] or White Committee[****] or Linton Committee[*****] or Daddario Committee,[******] they have all said the same thing. They said that we must set up a national system of monitoring for these toxic substances. They have said that we must refine our analytical tools. And they have said that we must develop much better knowledge about the chronic health effects of these substances.

I think it is essential that when we are dealing with a lake as critical as Lake Erie, we as conferees recommend to the Secretary of the Interior that he sponsor or introduce legislation or request appropriate funds to tool up the capability of the States and the Federal Government to deal with this problem. The capability today simply does not exist, and we do not have the tools to protect the population of the United States against these toxic substances.

And I think that it is important that we make this point and make it very, very forcefully. Because these technical people know that there is no protection at this point against these substances.

MR. STEIN: Walter, let me address myself to that.

---

* through ****** see 718a

* Carson, Rachel
"Silent Spring," Houghton Misslin, Boston, 1962

**
Hollis, Mark
Chief, Sanitary Engineer
Public Health Service, Department of Health, Education, and Welfare
Washington, D. C.

***
Tukey Committee
Report of the President's Science Committee
"Restoring the Quality of our Environment"
The White House, November 1965

****
White Committee
A Report of the Committee on Water, "Alternatives in Water Management,"
-Publication 1408, National Academy of Sciences, National Research
Council, Washington, D. C, 1966

*****
Linton Committee
Report of the Task Force on Environmental Health and Related Problems
to the Secretary of Health, Education, and Welfare,
Superintendent of Documents,
June 1967

******
Daddario Committee
Report of the Subcommittee on Science, Research and Development,
Serial S, Committee on Science and Astronautics,
U.S. House of Representatives, 88th Congress

I think what you say in a way is very valid, but I have another suggestion because I think the conferees have a better opportunity. It just happened that the mercury situation came to the fore in the Lake Erie Basin where we had a conference working. They have given us the job of coming up with a report on the mercury control program, and I think we are on our way.

In addition to that, because everyone is worried about what you are worried about, they have also given us the opportunity to come up with a general toxic control program.

Now, I think instead of just asking for money and a program which takes time to percolate through, the conferees here have an opportunity to come up with specific recommendations on how we are going to get that program operating, both in mercury and other toxic materials. If it requires legislation and money, as it very well might, we can come up with a specific program to the conference, or at least that we would propose to the Administration to take to the conference, without just going into a vague hunting expedition.

I think we have as good a sampling and as good an experience here as anyone. And I would say I am hoping out of this mercury operation, and out of the general view of the toxic material operation, that we may come up with recommendations for a much more specific national program than just to get the money for this program and to point out we have a problem in this area. I think we can move the whole situation a lot faster if we do that. And I have no notion about that.

One of the things we might consider is your suggestion for a national clearinghouse -- how we set this up, how we monitor and how we feed this stuff in. However, I would see that as either a task for the conferees or perhaps a task for a technical committee to be appointed by the conferees. Because I think, in the past, in other areas such as setting up specific numbers and standards, the conferees, for example, in Lake Michigan did that. They showed the way for national standards all through the country, and they beat them by years when they got out that little book of what the requirements would be in water quality.

I think this is the chance we have. As we work our way through, I hope the conferees will avail themselves of that and try to come up with a specific report. It might be a little too early yet, but when we reconvene, we may want to establish a committee to come up with specific recommendations on how we can move in this area.

And I am sure it will be much better if we have the book and the music when we go into Washington than if we just have a generalized feeling of a proposal.

MR. LYON: Well, I think we are together on this. I think that the important point is that this kind of a program consists of three elements. One is monitoring.

The other one is doing research on the health effects.

And the last item is to come up with better analytical methods.

Two of these certainly go beyond Lake Erie. And I think it would be quite appropriate for the conferees on Lake Erie to come up with such a program. I just hope that we don't delay this too long; that we try to tackle this job soon.

MR. STEIN: Obviously, you have given a lot of thought to it. By not delaying it too long, I would like to talk to you about commitments privately because I have a good idea about who could be the chairman.

MR. LYON: I will be glad to help.

MR. PURDY: Mr. Stein, Mr. Lyon mentioned delay. I would like to say from the standpoint of Michigan, there is not going to be a delay. In fact, this sort of program is under way. I don't intend to delay it at all because the Governor said this is something we shall do. It is being done, and it will be continued.

MR. LYON: I think, Ralph, our legislators were very impressed by Governor Milliken's statement. And they have asked for a copy of the 20-point program. This is definitely showing some real leadership in this field. This is the kind of thing we need to do.

MR. STEIN: Are there any other comments or questions on any of the aspects of the program?

MR. PURDY: I have a request from Dr. Shannon that he would like to make a statement with respect to mercury if Mr. Van Den Berg is through.

MR. VAN DEN BERG: I have a statement from Ohio.

MR. STEIN: Let us have a 10-minute recess.

(Whereupon, a recess was taken.)

MR. STEIN: Let's get going again.

Mr. Van Den Berg, would you go on?

MR. VAN DEN BERG: This is a status report, investigation of mercury contamination in the Ohio portion of Lake Erie.

Detrex Chemical Company

The effluent being discharged to Lake Erie by Detrex Chemical Company was sampled by Detrex on 10 days between March 4 and April 10, 1970. The analyses, made by

Detrex, were in the range of from 0.34 to less than 0.01 milligrams of mercury per liter. Since that time, Detrex has taken precautions which are designed to make sure that the mercury content of the effluent will not increase to the detectable limit. The Federal Water Quality Administration is continuing with a program of sampling and analysis.

MR. STEIN: May I ask an information question? What is a detectable limit?

MR. VAN DEN BERG: Ours is 1 ppb.

MR. STEIN: Do they set their own detectable limits?

MR. VAN DEN BERG: I don't know.

MR. STEIN: I don't mean for that to be a mean question, but this is always the key point in here. Unless you come up with a number, we are not quite sure what is detectable. Not only do you have to come up with the number, but you have to come up with the method.

MR. VAN DEN BERG: Survey of mercury users.

An investigation is being conducted of mercury losses by industry in Ohio. For the Lake Erie Basin, this was a joint effort by the Ohio Department of Health and FWQA. The companies surveyed were those reported by the U. S. Bureau of Mines as purchasers of mercury in 1969.

L. A. Van Den Berg

The results to date have not disclosed any significant discharge except that discussed above for Detrex Chemical Company. FWQA is continuing the investigation.

To the best of our knowledge, there is no seed processors in Ohio who use a mercury compound for seed treatment. An agricultural chemical company, who formerly produced mercury fungicides, discontinued the production about a year ago.

A survey of the paper industries in Ohio who discharge into the Lake Erie Basin indicates that it has been several years since any of these paper mills have used any slimicide containing mercury.

Lake Erie Water

Samples of raw water were obtained from each of the municipal water supply intakes, 22 in all. These were analyzed by the Ohio Department of Health Laboratory and by Battelle Memorial Institute. Battelle performed the analyses at no charge, as a public service. The results showed that all of the samples contained less than detectable amounts of mercury and specifically less than 5 parts of mercury per billion parts of water. The probability is high that the actual mercury content, if it could be detected, would be between zero and one-half of one part per billion.

That concludes the Ohio statement.

(The above-discussed report follows in its entirety.)

INVESTIGATION OF MERCURY IN THE ST. CLAIR RIVER - LAKE ERIE SYSTEMS

Federal Water Quality Administration
Great Lakes Regional Office
Lake Huron Basin Office
Lake Erie Basin Office
National Field Investigations Center

May 1970

ERRATA SHEET (JULY 10, 1970)

TABLE 1

MERCURY ANALYSES OF DETREX EFFLUENT AND RECEIVING WATERS

Date	Sta. No. 4 Ditch mouth mg/l	Sta. No. 4 Ditch mouth lbs/day**	Sta. No. 2 Ditch below Detrex mg/l	Sta. No. 2 Ditch below Detrex lbs/day***	Sta. No. 1 Sump effluent mg/l	Sta. No. 1 Sump effluent lbs/day***
3-4-70			0.02	0.6		
3-13-70			0.02	0.6		
3-18-70			0.34	9.5		
3-25-70			< 0.02	< 0.6		
4-3-70	< 0.01	< 2.0	0.07	2.0		
4-6-70			0.11	3.1		
4-7-70			0.04	1.1		
4-8-70			< 0.01	< 0.3		
4-9-70			0.29	8.1		
4-10-70	< 0.01	< 2.0	0.132	3.7		
4-17-70	0.009	1.8	0.340	9.5	0.072	1.5
4-18-70	0.005	1.0	0.040	1.1	0.020	0.4
4-19-70	0.012	2.3	0.135	3.8	0.108	2.2
4-20-70	0.005	1.0	0.058	1.6	0.092	1.9
4-21-70	0.013	2.5	0.058	1.6	0.046	0.9
4-22-70	0.005	1.0	0.035	1.0	0.049	1.0
4-23-70	0.007	1.4	0.045	1.3	0.066	1.4
4-24-70	0.006	1.1	0.030	0.8	0.021	0.4
5-6-70	0.002	0.4			0.044	0.7

Underlined analyses by Detrex; all others by LEBO

* Data obtained from Detrex; data reported earlier by Detrex showed < 0.01 mg/l for 4-8- and 4-10-70.

** Loadings based upon 23.3 mgd ditch flow which includes flow from Detrex, Linde Welding, and Linde Air.

*** Loadings based upon 3.34 mgd from Detrex only.

**** Loadings based upon 2.45 mgd from Detrex sump effluent only.

727<

This report was developed by personnel of the Great Lakes Regional Office, Lake Huron Basin Office, and Lake Erie Basin Office in cooperation with personnel of the National Field Investigations Center.

723<

TABLE OF CONTENTS

Page

SUMMARY AND CONCLUSIONS - 1

RECOMMENDATIONS - 7

INTRODUCTION - 8

USES OF MERCURY - 10

REFERENCES - 13

MERCURY ANALYSES IN THE ST. CLAIR RIVER, LAKE ST. CLAIR, DETROIT RIVER AND WESTERN LAKE ERIE- - - - - - - - - - - 14

LOWER ST. CLAIR RIVER AND LAKE ST. CLAIR - - - - - - - - 15

UPPER DETROIT RIVER (LAKE ST. CLAIR TO GRASSY ISLAND)- - 20

LOWER DETROIT RIVER (GRASSY ISLAND TO MOUTH) - - - - - - 25

WESTERN BASIN OF LAKE ERIE, INCLUDING THE RAISIN AND MAUMEE RIVERS - - - - - - - - - - - - - - - - 31

MERCURY ANALYSES IN THE EASTERN PORTION OF THE LAKE ERIE BASIN - 38

HEAVY METALS IN THE LAKE ERIE BASIN - - - - - - - - - - - - - 44

APPENIDX I - 52
REPORT ON WYANDOTTE CHEMICALS CORPORATION,
WYANDOTTE, MICHIGAN

APPENDIX II - 61
REPORT ON DETREX CHEMICAL CORPORATION,
ASHTABULA, OHIO

Page

APPENDIX III - 77
INVENTORY OF INDUSTRIES USING
MERCURY IN THE LAKE ERIE

APPENDIX IV - 86
FISH ANALYZED FOR MERCURY CONTENT

APPENDIX V - 92
STANDARDS FOR MERCURY AND HEAVY METALS
LAKE ST. CLAIR - LAKE ERIE DRAINAGE AREA

APPENDIX VI - 94
CHRONOLOGY OF EVENTS

730<

INVESTIGATION OF MERCURY
IN THE
ST. CLAIR RIVER - LAKE ERIE SYSTEMS

SUMMARY AND CONCLUSIONS

1. Data provided by the Bureau of Commercial Fisheries, Technological Laboratory, Ann Arbor, Michigan, show that mercury was present in fish throughout the St. Clair River - Lake Erie System. Concentrations (parts per million, wet weight) in the edible portions of various fish were:

Yellow Perch	0.32 to 1.70
Northern Pike	0.64
Coho Salmon	0.24 to 0.96
Carp	0.08 to 0.28
White Bass	0.53 to 0.80
Steelhead	<0.15
Walleye Pike	1.4 to 3.57
Channel Catfish	0.32 to 1.8
Gizzard Shad	0.24
Sucker	0.88
Sheepshead	0.24

2. Available information indicates that no measurable concentration of mercury was present in water supply intakes in the St. Clair - Lake Erie System.

3. Mercury in excess of 1 mg/kg dry weight was present in sediments in the Erie, Pennsylvania, and Euclid and Cleveland, Ohio, areas and the Buffalo, Black, and Ashtabula rivers. Results of analyses indicate the following levels of mercury in the areas specified:

AREA	MERCURY LEVELS IN SEDIMENT (mg/kg dry weight)
St. Clair River	Mercury was present at mile points 37.0, 33.0, and 25.5 in concentrations of 1.0, 0.2, and 0.3 mg/kg, respectively. All other samples indicated the presence of mercury.
Lake St. Clair	Six sediment samples in the navigation channel, off-shore from the mouth of the St. Clair River, contained mercury at concentrations ranging from 0.3 to 9.2 mg/l. Samples from a dredging disposal area had concentrations of 1.7 and 2.1 mg/kg. All other samples indicated the presence of mercury.
Upper Detroit River (Headwaters to Grassy Island)	Mercury was not measurable at the head of the Detroit River, but ranged from 1.4 mg/kg in backwater areas along the U. S. shore upstream from the Rouge River and as high as 2.0 mg/kg in backwater areas downstream from the Rouge.
Lower Detroit River Trenton Channel	In a narrow strip of about 20 to 100 feet along the U. S. shoreline concentrations ranged from 86.0 to 5.4 mg/kg within a mile downstream from the Wyandotte Chemicals' outfall and then vary from 26.0 mg/kg to trace amounts downstream to Lake Erie, depending on the settling characteristics at the specific point.

Main Channel of Detroit River	One sample collected between Grassy Island and Grosse Ile contained 4.4 mg/kg of mercury; one on the east side of Fighting Island contained 1.2 mg/kg; and one near the Canadian shore near the mouth contained 0.6 mg/kg.
Northern Grosse Ile	Mercury was not present in measurable amounts in samples along the northern part of Grosse Ile, the area of Wyandotte Chemicals' waste beds, but trace amounts were indicated.
Western Lake Erie Michigan Waters	Concentrations near the Detroit Light varied from 1.0 to 2.1 mg/kg. Along the Michigan shore, mercury was not measurable. Near LaPlaisance Bay one sample contained 0.8 mg/kg.
Ohio Waters	Four points near West Sister Island had concentrations ranging from 1.6 to 2.1 mg/kg. In other areas nearer the shore, mercury was not measurable.
Canadian Waters	Concentrations of 1.3 to 2.7 mg/kg were present at three points extending eastward about 15 miles from the Detroit Light and about 5 miles from the Ontario shore. Points extending to Pelee Island had no measurable mercury.
Eastern Lake Erie Ohio Waters	Concentrations of 2.0 and 2.4 mg/kg were present off shore from mouth of the Grand River and Cleveland Harbor, respectively. Off shore from the Cleveland Easterly Sewage Treatment Plant, a concentration of 4.0 mg/kg occurred.

Pennsylvania Waters	A concentration of 1.1 mg/kg was present in a sample from Presque Isle Bay.
Tributaries	Concentrations in excess of 1.0 mg/kg were present in the Black, Ashtabula, and Buffalo rivers. In the Rouge, Huron, Maumee, Sandusky, Portage, Rocky, Cuyahoga, Grand, and Raisin rivers, the concentrations were less than 1.0 mg/kg.

4. The waters of the study area revealed no mercury except for one sample collected at mile point 13.3 in the Trenton Channel downstream from the Wyandotte Chemical Company; this concentration was 0.03 mg/l.
5. The Detroit River area is the primary source of mercury in the western end of Lake Erie. This is revealed by the distribution pattern established through sediment samples.
6. Because of mercury discharges, the State of Michigan stopped the production of chlorine by Wyandotte Chemicals Corporation until a treatment system was developed and the mercury-bearing wastes were removed from the receiving waters.
7. The State of Ohio issued an order to the Detrex Chemical Industries, Inc., Ashtabula, Ohio, on April 13, 1970, to " . . . cease and desist the discharge of liquid industrial waste containing any mercurial compounds to waters of the state." Some operational changes were made but data collected on

732<

May 11, 1970, indicate that Detrex still discharged 1.2 pounds of mercury per day.

8. Allied Chemical Co., Buffalo Dye Division, Buffalo, New York, is a source of mercury to the Buffalo River. On May 8, 1970, a sample of the plant effluent revealed 0.12 mg/l mercury. The company stated that the process utilizing mercury was not in use on that day. Based on this information, Allied Chemical Co. was discharging approximately 4 pounds of mercury per day from sources other than the reported production of disulfo intermediates.

9. The discharge from Diamond Shamrock, Painesville, Ohio, to the Grand River had a concentration of 0.010 mg/l mercury on April 4, 1970.

10. Concentrations of 0.002 mg/l were present in the effluents from the Ann Arbor and Wayne County-Wyandotte, Michigan, waste water treatment plants. No measurable concentration of mercury was present in six other waste water treatment plant effluents investigated in Michigan (State data). Concentrations of 0.004, 0.003, and 0.004 mg/l mercury were present in Euclid and Cleveland Westerly and Southerly sewage treatment plant effluents, respectively. Although no measurable concentration of mercury was present in the Cleveland Easterly sewage treatment plant effluent, which receives wastes from several users of mercury, 4 mg/kg were present in Lake Erie sediments 100 feet north of the discharge point.

11. On May 7, 1970 a concentration of 0.011 mg/l mercury was present in the outfall from the National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio. This occurred during a period when there was no discharge from lagoons that supposedly receive all mercury wastes from known sources.
12. Investigations of additional potential dischargers of mercury to Lake Erie are in progress by the **states** and the Federal Water Quality Administration.

RECOMMENDATIONS

1. Surveillance and sampling programs be initiated by industries, municipalities, States and the Federal Government to locate and identify all sources or potential sources of mercury and to determine mercury concentrations in surface waters, land run-off, waste streams, aquatic life, and sediments.
2. All dischargers of mercury to surface or ground waters or to municipal or regional waste treatment plants, including Federal installations, be ordered to cease and desist.
3. Precautionary measures be taken by all users and possessors of mercury or mercurial compounds for any purpose to prevent accidental spills or other losses to the water environment.

INTRODUCTION

The toxic effects of mercury and its compounds in the water environment are well known and are documented in the literature. However, much remains to be learned on toxicity limits of the various mercurial compounds in the water environment. The upper limit of mercury in food, used by the Food and Drug Administration, is 0.5 parts per million wet weight. Limits have also been set for atmospheric concentrations and numerous cases of poisoning have been reported.

Critical pollution from mercury became apparent on March 24, 1970, in the Great Lakes. Mercury concentrations as high as 5000 parts per billion (or 5 ppm) were reported in some of the pickerel shipments from Canada and commercial fishing involved was suspended by Canada, then Ohio, Michigan and New York. The presence of mercury in fish and bottom sediments in the St. Clair River-Lake Erie system has confirmed the existence of an environmental problem of major scope.

Mercury is discharged to the water environment from industrial processes and uses of mercurial products. In 1968, mercury produced from mining in the United States was 2,194,000 pounds. The total amount used in 1968 however, was 5,732,000 pounds. Over 163 million pounds of mercury have been consumed in the United States in the present century, but little information is available on the final disposition of it and amounts accumulated in the environment.

Metallic mercury and mercurial compounds in liquid wastes are characterized by their high densities. Free mercury and the mercurous compounds form sludges and settle to the bottom of receiving waters. The mercuric compounds form precipitates with oxides, phosphates, sulfides and carbonates. The high density is responsible for the rapid deposition in bottom sediments where they persist, become subject to sediment transport and are available to the aquatic life.

Metallic mercury can be oxidized readily to divalent mercury ions under the conditions present at the bottom of lakes and rivers. This has been shown to occur experimentally as well. The divalent inorganic mercury produced has an extremely strong affinity for organic muds and is biologically methylated in the bottom sediments. Divalent organic mercury, when methylated, is readily released from the sediments into the water.

Many fish are bottom feeders or feed upon organisms which are bottom dwellers and therefore the hazard of mercury ingestion becomes very great. Fish also absorb mercury from the water through the gills and possibly the scales.

Since biological concentration of mercury occurs, the accumulation of mercury in the food chain is a matter of grave concern. A recent report[5/] indicates a magnification or concentration of mercury of over a million in the protoplasm of bacterial species. It has been demonstrated that the concentration from water to pike is in the order of 3,000 or more.[6/]

Uses of Mercury

Sources of mercury in the environment principally come from industrial processes utilizing a form of mercury and the use of mercurial products by man.

The industrial uses in 1968 are listed in the following table:[1]

	Thousand of Pounds
1. Electrical apparatus	1,492
2. Electrolytic preparation of chlorine and caustic soda	1,326
3. Paints	803
4. Charging new installations of chlorine and caustic soda cells	630
5. Industrial and control instruments	581
6. Agricultural uses	260
7. Dental preparations	158
8. Catalyst preparations	145
9. Laboratory uses	151
10. Pharmaceuticals	32
11. Paper and pulp uses	31
12. Amalgamation (mercury alloys)	20

Mercury is used as the cathode in the electrolytic manufacture of chlorine with caustic soda and hydrogen as by-products. Cell recharging to make up the various losses from this process was 26 percent of the total mercury used in 1968 by all industries. To maintain the mercury inventory it required purchases of 1.3 million pounds of mercury in 1968. Weak spent brines, acids from the chlorine driers, brine sludges and cell cleanings are discharged to the water environment from this process. The mercury may be metallic mercury emulsion, soluble and insoluble mercury salts.

In 1968, 630,000 pounds of mercury were used in the start-up of new electrolytic installations. This amount eventually contributes to the cell losses.

Information from manufacturers of mercurials used for herbicides, fungicides and bactericides is not readily available. These compounds usually are produced in batch processes and require considerable clean up with possible losses of mercury.

In the paper and pulp industry, phenyl mercury acetate is used for slime control and ground wood pulp may contain up to 20 ppm of the fungicide.[4/] This mercury is either lost to the product or to the waste load during processing. In either case it becomes a waste.

Large quantities of mercury are used in the manufacture of electrical apparatus and industrial and control instruments such as mercury cells, arc lights, pumps and switches. This poses a hazard of loss during the manufacturing process.

Catalysts, containing 10 percent mercuric chloride are manufactured for use by the petrochemical industry. This is made by passing a water solution of mercuric chloride over carbon and is used for making vinyl chloride from acetylene. Another catalyst containing mercuric sulfate is used in processing acetylene to acetaldehyde. There are losses to the water environment from these processes.

Paints, those used for mildew control as well as those having anti-fouling characteristics, contain mercury, usually in the organic form. Erosion from paint films containing these compounds is another source of loss to the environment.

Mercury is used in dentistry for the preparation of amalgams. Minor losses may result from this use.

Laboratory use of mercury in manometers, thermometers, calomel cells, standard cells and as reagents results in an occasional discharge to sewers. In large research centers or universities, the quantities can become appreciable.

Minor users of mercury are the pharmaceutical manufacturers and in amalgamation. In the pharmaceutical manufacture, diuretics and antiseptics, i.e. calomel, phenyl mercury acetate and merthiolate are made. Accidental spills are the source of loss to the water environment.

The recovery of gold and silver by mercury amalgam is a wet process and may result in rather high losses of mercury in the plant effluent.

Additional mercury is introduced to the water environment through the use of products containing mercurial compounds. The most wide-spread example of this is in the agricultural application of fungicides and pesticides, which results in losses during periods of run-off from the area to which they are applied.

References

1. Minerals Yearbook, 1968, Vol. 1-11, Metals, Minerals and Fuels, Bureau of Mines, Chapter on "Mercury" by J. M. West.
2. Woods, J. M. "Environmental Pollution by Mercury," Advances in Environmental Science, Vol. II (In Print).
3. Jernelov, P. "Biological Methylation of Mercury in Aquatic Organism," Nature, Vol. 223, No. 5207, pp. 753-754, August 16, 1969.
4. Smart, N. A. "Use and Residues of Mercury Compounds in Agriculture," Residue Reviews, Vol. 23, pp. 1-36. 1968.
5. Battelle Memorial Institute, Design of an Overview-System for Evaluating the Public-Health Hazard of Chemicals in the Environment, Appendix A, 1967.
6. Johnels, A. G., et al. "Pike (Esox lucius L.) and Some Other Aquatic Organisms in Sweden as Indicators of Mercury Contamination in the Environment," Oikos, 18(2): 323-333, 1967.

MERCURY ANALYSES IN THE ST. CLAIR RIVER, LAKE ST. CLAIR, DETROIT RIVER AND WESTERN LAKE ERIE

The FWQA-Lake Huron Basin Office (LHBO) initiated a water and sediment sampling and analysis program for mercury in the St. Clair River -- Lake Erie system immediately after the Canadian government announced the fishing ban in Lake St. Clair on March 24, 1970.

Sample collections were made by personnel from the Lake Huron Basin Office with assistance from the Michigan Water Resources Commission.

Water samples were collected with a surface grab-sampler. Sediment samples were obtained by the use of either a Petersen dredge or a drag line sampler. These devices penetrate the bottom to a depth of about one-fourth foot. Physical properties such as odor, color, and general composition of the bottom materials were recorded.

The State of Michigan reports no measurable mercury in any water supply intakes within this area.

State data on analyses of 24-hour composite samples from nine municipal waste water treatment plants revealed concentrations of 0.002 mg/l at the Ann Arbor, Michigan, and Wayne County-Wyandotte, Michigan, plants on April 14, 1970.

742<

ST. CLAIR RIVER AND LAKE ST. CLAIR

One water sample and 26 sediment samples were collected and analyzed from Lake St. Clair (Table 1 and Figure 1). Six sediment samples in the navigation channel contained mercury in concentrations from 0.3 to 9.2 mg/kg dry weight. Two samples from a dredging disposal area contained mercury at concentrations of 1.7 and 2.1 mg/kg dry weight. In the other 18 sediment samples the presence of mercury was indicated, but was less than the measurable limit. The water sample contained less than the measurable limit.

Sampling of the St. Clair River began on March 26, 1970. Fifteen samples of sediments and six water samples were collected between river mile (R.M.) 10.4 and 37.0. Sediment samples from R.M. 37.0, 33.0, and 25.5 contained concentrations of 1.0, 0.2, and 0.3 mg/kg, respectively (Table 1 and Figure 1). The other 12 sediment samples contained less than the measurable limit of 0.5 mg/kg wet weight, but indicated that traces of mercury were present. The six water samples contained no measurable concentrations of mercury.

Table 1

743<

MERCURY SURVEY

Sample Analysis Results

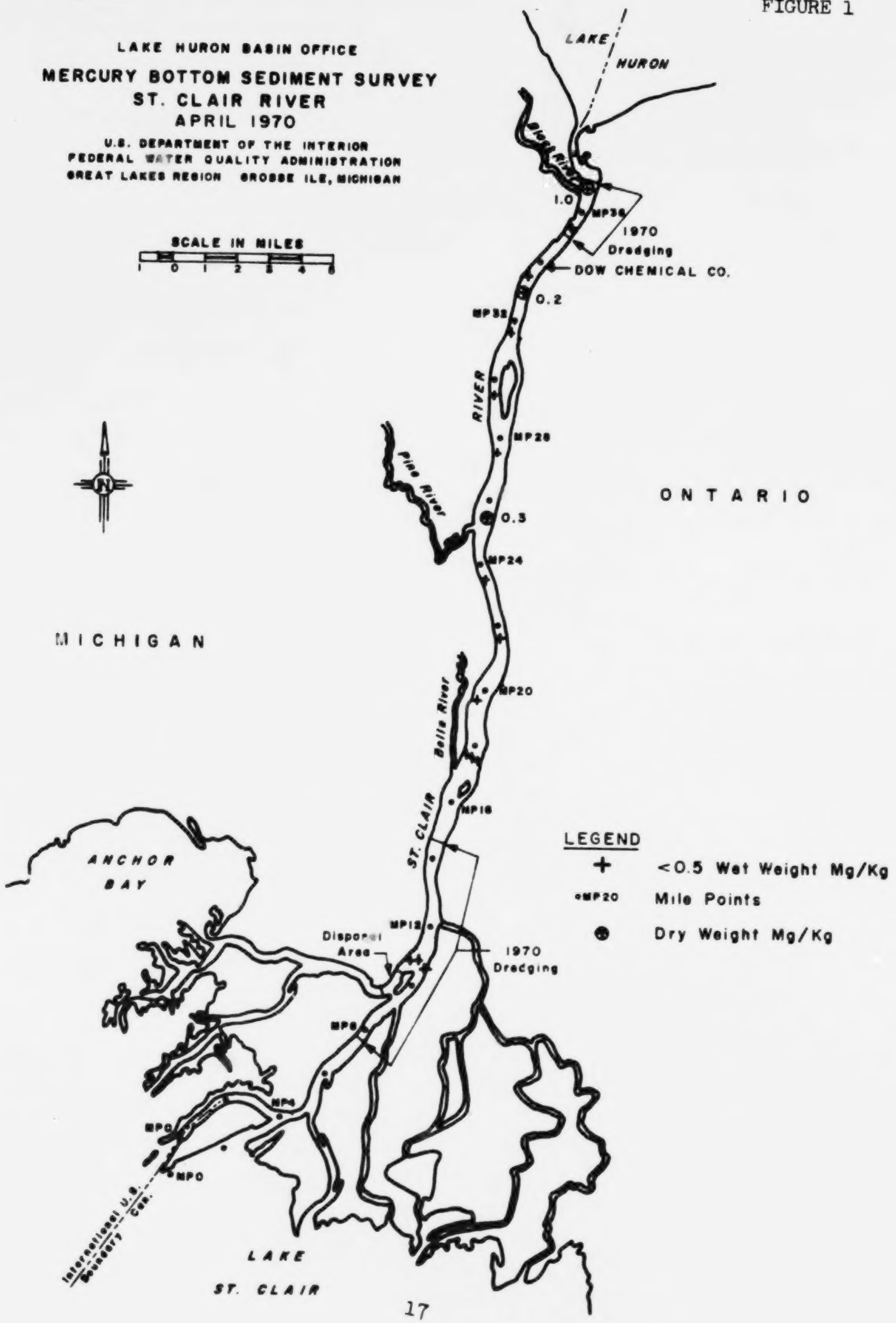
St. Clair River

Sample Collection Date	Location		Mercury Content		
			Sediment (mg/kg)		
	River Mile	Ft. from U.S. Shore	Wet Basis	Dry Basis	Water (mg/l)
1970					
3/26	10.4	20	< 0.5		< 0.01
"	10.6	1850			< 0.01
"	10.6	4120	< 0.5		< 0.01
"	17.5	20	< 0.5		< 0.01
"	17.5	1500			< 0.01
"	17.5	2700	< 0.5		< 0.01
4/30	35.4	100	< 0.5		
"	33.5	100	< 0.5		
"	31.5	100	< 0.5		
"	29.5	100	< 0.5		
"	27.5	100	< 0.5		
"	23.5	100	< 0.5		
"	21.5	100	< 0.5		
"	19.5	100	< 0.5		

744<

FIGURE 1

LAKE HURON BASIN OFFICE
MERCURY BOTTOM SEDIMENT SURVEY
ST. CLAIR RIVER
APRIL 1970
U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER QUALITY ADMINISTRATION
GREAT LAKES REGION GROSSE ILE, MICHIGAN


SCALE IN MILES
1 0 1 2 3 4 5
N
LAKE HURON
Black River
1.0
MP36
1970 Dredging
DOW CHEMICAL CO.
0.2
MP32
RIVER
MP28
Pine River
ONTARIO
0.3
MP24
MICHIGAN
MP20
Belle River
ST. CLAIR
MP16
ANCHOR BAY
MP12
Disposal Area
1970 Dredging
MP8
MP4
MP0
MP0
International U.S. Boundary Can.
LAKE ST. CLAIR

LEGEND
+ <0.5 Wet Weight Mg/Kg
•MP20 Mile Points
⊕ Dry Weight Mg/Kg

Table 2

MERCURY SURVEY

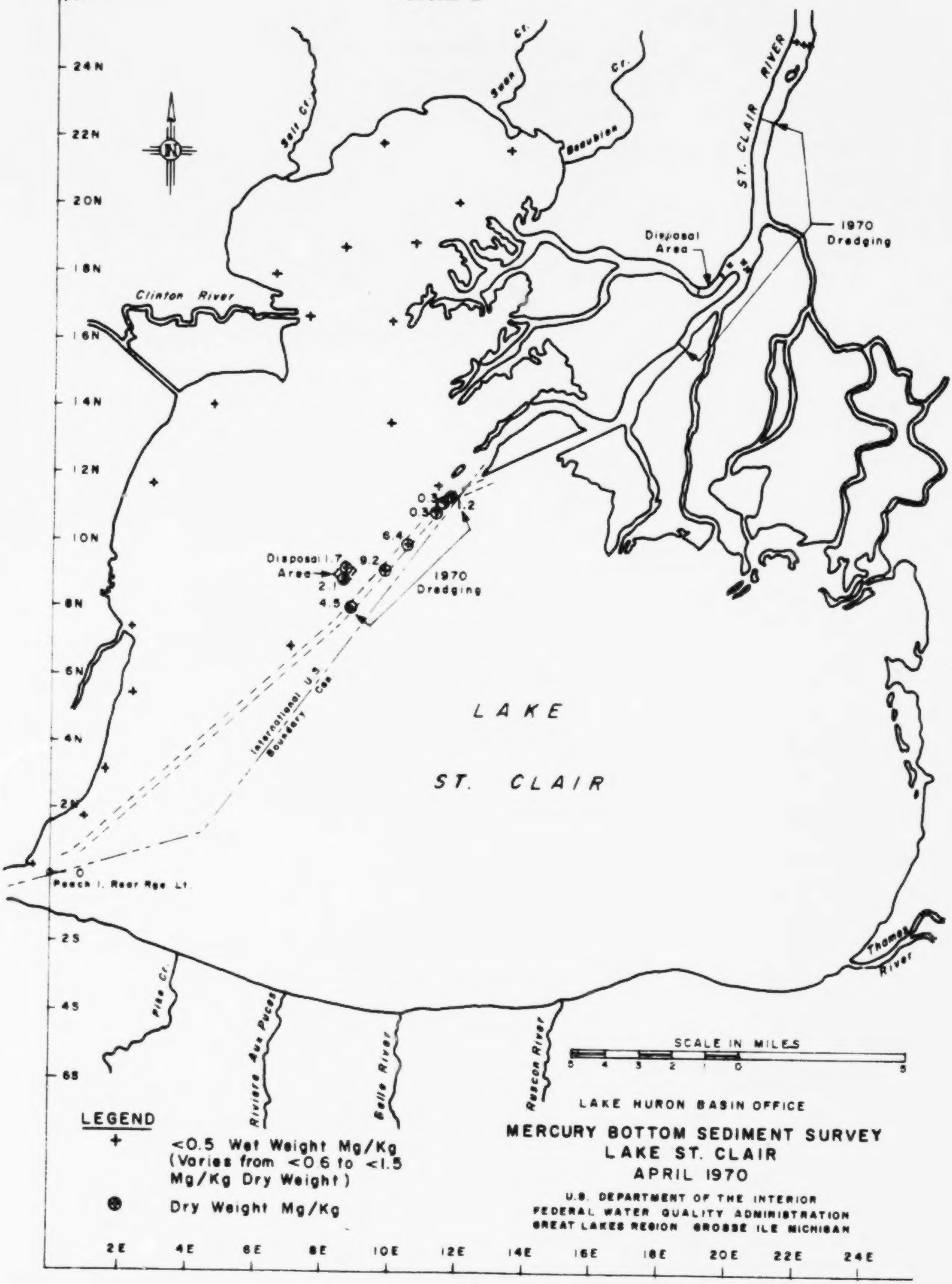
Sample Analysis Results

Lake St. Clair

Sample Collection Date	Location Grid Coordinates		Mercury Content Sediment (mg/kg) Wet Basis	Dry Basis	Water (mg/l)
1970					
4/15	18.8N	10.6E	< 0.5		
"	3.8N	4.3E			< 0.005
"	13.5N	9.9E	< 0.5		
"	16.5N	10.0E	< 0.5		
"	16.6N	7.6E	< 0.5		
"	18.7N	8.6E	< 0.5		
"	20.0N	11.9E	< 0.5		
4/21	0.4N	0.4W	< 0.5		
"	1.8N	1.1E	< 0.5		
"	3.2N	1.7E	< 0.5		
"	5.5N	2.5E	< 0.5		
"	7.5N	2.3E	< 0.5		
4/22	6.8N	7.1E	< 0.5		
"	11.2N	11.2E	< 0.5		
"	11.6N	2.9E	< 0.5		
"	13.9N	4.8E	< 0.5		
"	17.8N	6.6E	< 0.5		
"	21.7N	9.6E	< 0.5		
"	21.5N	13.4E	< 0.5		

745-a

FIGURE 2


24N
22N
20N
18N
16N
14N
12N
10N
8N
6N
4N
2N
2S
4S
6S
2E
4E
6E
8E
10E
12E
14E
16E
18E
20E
22E
24E
N
Salt Cr.
Swan Cr.
Beaubien Cr.
ST. CLAIR RIVER
Clinton River
Disposal Area
1970 Dredging
0.3
0.3
1.2
6.4
Disposal 1.7
Area
2.1
9.2
4.5
1970 Dredging
International U.S. Boundary Can.
LAKE
ST. CLAIR
0
Peach I. Rear Rge. Lt.
Pike Cr.
Riviere Aux Puces
Belle River
Ruscom River
Thames River
SCALE IN MILES
5 4 3 2 1 0 5
LAKE HURON BASIN OFFICE
MERCURY BOTTOM SEDIMENT SURVEY
LAKE ST. CLAIR
APRIL 1970
U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER QUALITY ADMINISTRATION
GREAT LAKES REGION GROSSE ILE MICHIGAN
LEGEND
+ <0.5 Wet Weight Mg/Kg (Varies from <0.6 to <1.5 Mg/Kg Dry Weight)
⊗ Dry Weight Mg/Kg

UPPER DETROIT RIVER (LAKE ST. CLAIR TO GRASSY ISLAND)

Sampling of the upper Detroit River and lower Rouge River began on March 26, 1970, and continued to April 24. Sixteen sediment and six water samples were obtained, as indicated in Tables 3 and 4, and shown on Figures 3 and 4. Mercury was detected in sediments along the U. S. shoreline at boat ramps and in other backwater areas. Values ranged from less than the measurable level near the headwaters to 2.0 mg/kg downstream from the Rouge River. Concentrations in sediments around Grassy Island and upper Fighting Island were less than the measurable limit.

746<

Table 3

MERCURY SURVEY

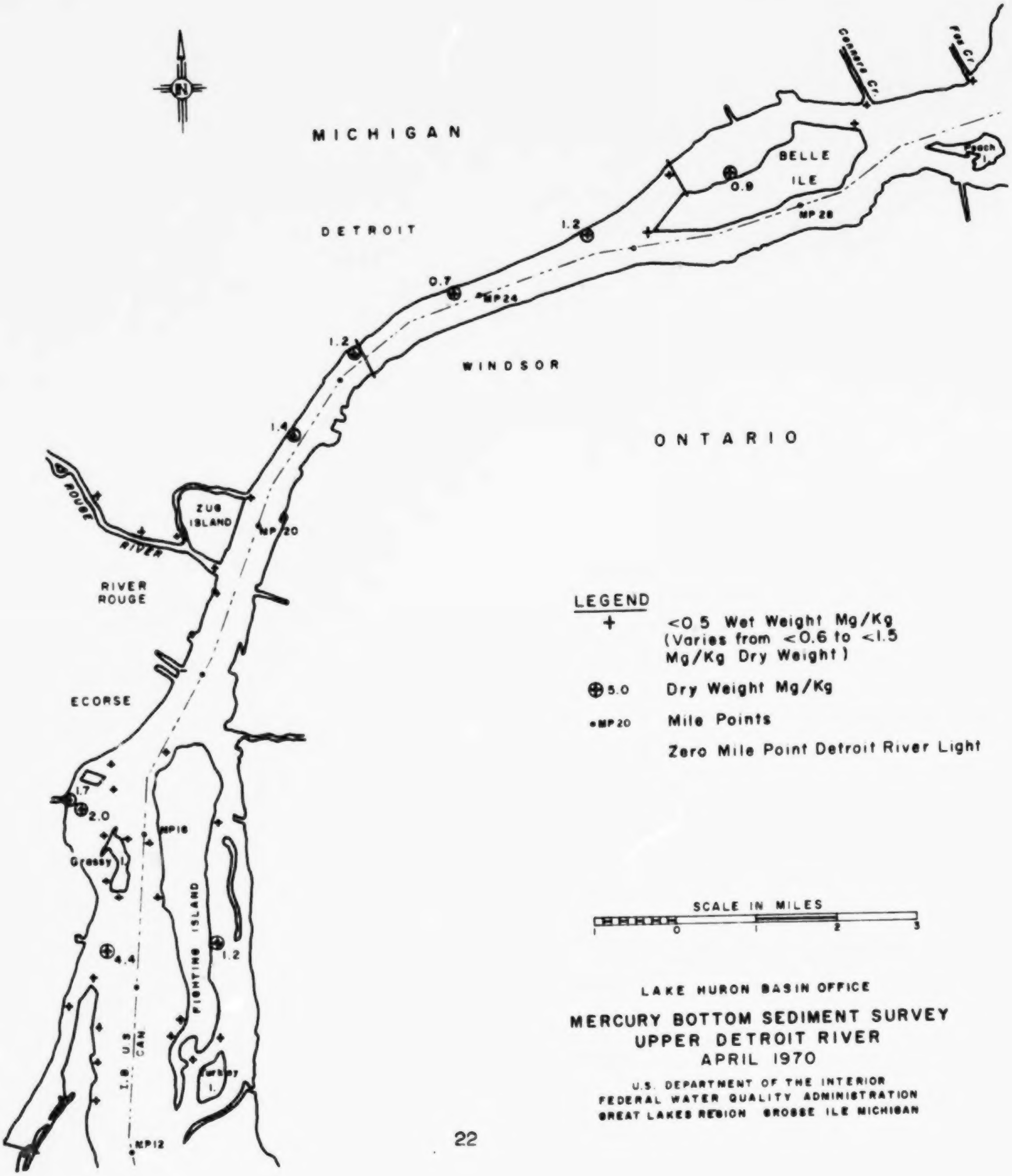
Sample Analysis Results

Upper Detroit River
(upstream from the Rouge River)

Sample Collection Date	Location		Mercury Content		
			Sediment (mg/kg)		Water
	River Mile	Feet from U.S. Shore	Wet Basis	Dry Basis	(mg/l)
1970					
3/26	26.8	700	< 0.5		< 0.01
3/30	30.8	500			< 0.01
"	30.8	1000			< 0.01
"	30.7	500			< 0.01
"	30.7	980			< 0.01
4/14	29.3	1600	< 0.5		
4/23	30.8	0	< 0.5		
"	29.4	0	< 0.5		
"	27.4	3300	0.6	0.9	
"	26.2	2300	< 0.5		
"	25.7	0	0.9	1.2	
"	23.8	100	0.5	0.7	
"	22.3	0	0.6	1.2	
"	21.1	0	0.7	1.4	

FIGURE 3

747<


N
MICHIGAN
DETROIT
WINDSOR
ONTARIO
BELLE ILE
Peach I.
Conners Cr.
Fox Cr.
ZUG ISLAND
ROUGE RIVER
RIVER ROUGE
ECORSE
Grassy I.
FIGHTING ISLAND
Turkey I.
I.B. U.S. CAN.
MP 28
MP 24
MP 20
MP 16
MP 12
0.9
1.2
0.7
1.2
1.4
1.7
2.0
4.4
1.2
LEGEND
+ <0.5 Wet Weight Mg/Kg (Varies from <0.6 to <1.5 Mg/Kg Dry Weight)
⊕5.0 Dry Weight Mg/Kg
•MP20 Mile Points
Zero Mile Point Detroit River Light
SCALE IN MILES
1 0 1 2 3

LAKE HURON BASIN OFFICE

MERCURY BOTTOM SEDIMENT SURVEY
UPPER DETROIT RIVER
APRIL 1970

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER QUALITY ADMINISTRATION
GREAT LAKES REGION GROSSE ILE MICHIGAN

748<

Table 4

MERCURY SURVEY

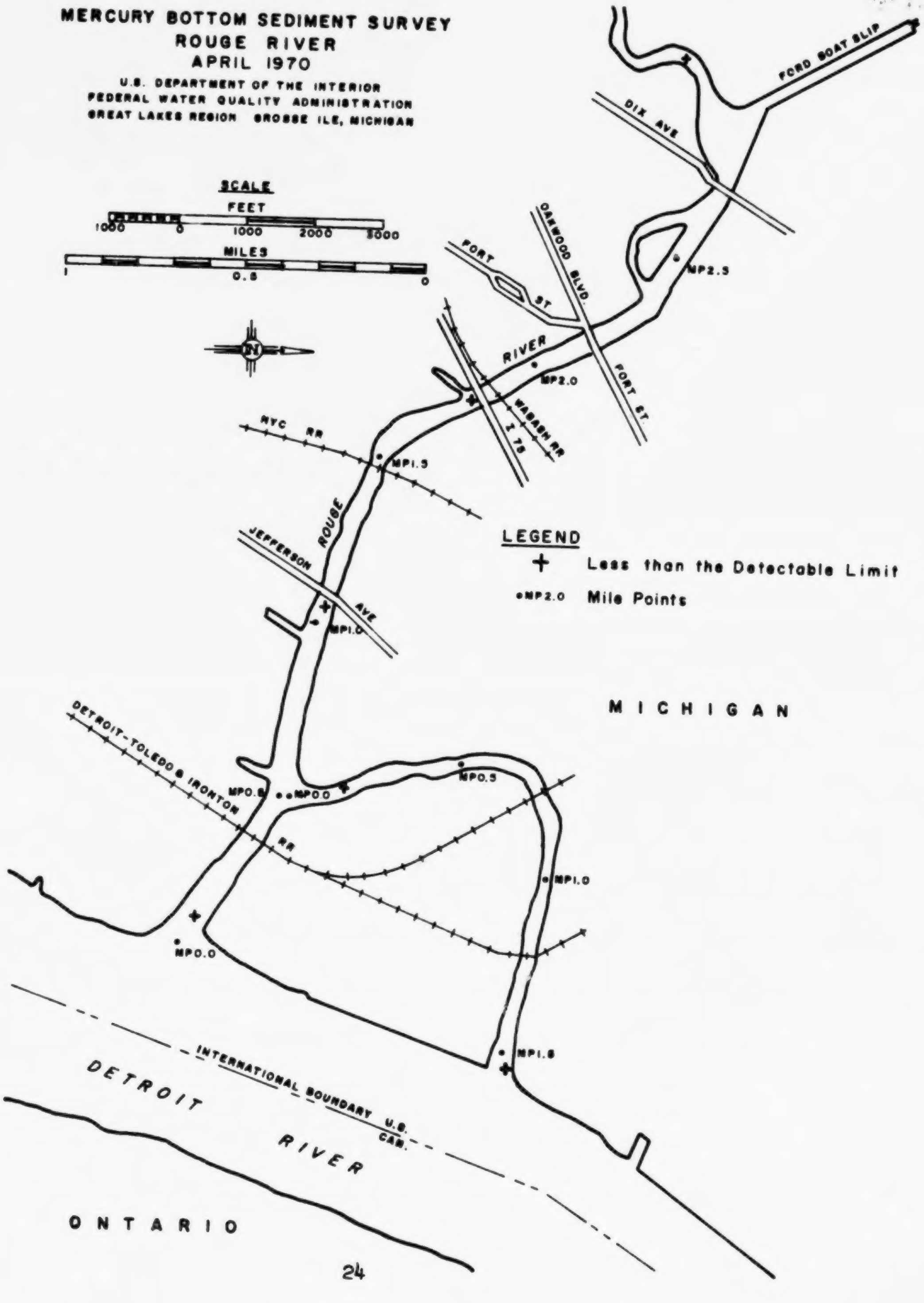
Sample Analysis Results

Rouge River

Sample Collection Date	River Mile	Mercury Content		
		Sediment (mg/kg)		Water (mg/l)
		Wet Basis	Dry Basis	
1970				
3/26	1.1	< 1.0		< 0.01
4/23	.3 Old Channel	< 0.5		
"	1.5 Old Channel	< 0.5		
4/24	1.8	< 0.5		
"	3.1	< 0.5		
"	.1	< 0.5		

FIGURE 4

749<



LAKE HURON BASIN OFFICE

MERCURY BOTTOM SEDIMENT SURVEY
ROUGE RIVER
APRIL 1970

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER QUALITY ADMINISTRATION
GREAT LAKES REGION GROSSE ILE, MICHIGAN

SCALE
FEET
1000
0
1000
2000
3000
MILES
1
0.5
0
N
LEGEND
+ Less than the Detectable Limit
• MP2.0 Mile Points
FORD BOAT SLIP
DIX AVE
OAKWOOD BLVD.
FORT ST
MP2.5
RIVER
MP2.0
WABASH RR
I 75
FORT ST.
NYC RR
MP1.5
ROUGE
JEFFERSON AVE
MP1.0
MICHIGAN
DETROIT-TOLEDO & IRONTON RR
MP0.5
MP0.0
MP0.5
MP1.0
MP0.0
MP1.5
INTERNATIONAL BOUNDARY U.S. CAN.
DETROIT RIVER
ONTARIO

LOWER DETROIT RIVER (GRASSY ISLAND TO MOUTH)

In the portion of the Detroit River from Grassy Island to the mouth at Lake Erie, 78 sediment and 23 water samples were collected between March 26 and April 16, as shown in Tables 5 and 6 and Figure 5. The highest levels of mercury occurred in the bottom muds of the Trenton Channel downstream from the Wyandotte Chemicals Corp. South Works, in a narrow strip of from 20 to 100 feet along the western shore. Concentrations along the east shore of the channel near Grosse Ile were less than the measurable limit of 0.5 mg/kg. Mercury in the sediments indicates that the Wyandotte Chemicals' mercury discharge hugs the western shore of the Trenton Channel, depositing mercury in the bottom muds along shore. No mercury was present around Wyandotte Chemicals' waste beds, located on the northern tip of Grosse Ile. However, one sample collected between Grassy Island and Grosse Ile contained 4.4 mg/kg mercury.

Mercury contamination in sediments was present along shore as far as Lake Erie. In addition to high values near Wyandotte Chemicals, one sample with 26.0 mg/kg dry weight was collected at the northern tip of Horse Island (Gibralter, Michigan) at mile point 6.7.

Of the four samples collected at the southern end of Fighting Island, one contained 1.2 mg/kg mercury, and the others contained trace amounts, but all were below the measurable limit. Wyandotte Chemicals waste lagoons are located on Fighting Island.

The only mercury measurable in four samples in Canadian sediments was near the shore at mile point 3.9 (0.6 mg/kg).

As indicated in the tables, the levels of mercury in all water samples but one were below the measurable limit of 0.01 mg/l. One sample collected 300 feet downstream from Wyandotte Chemicals outfall W23 (RM 13.3) contained 0.03 mg/l. The effluent was diluted by Detroit River water so mercury was not measurable further downstream from the discharge point.

750-a

Table 5

MERCURY SURVEY

Sample analysis Results

Lower Detroit River
(below the mouth of the Rouge River
excluding the Trenton Channel)

Sample Collection Date	Location		Mercury Content		
	River Mile	Ft. from U.S. Shore	Sediment (mg/kg)		Water (mg/l)
			Wet Basin	Dry Basis	
1970					
3/27	13.5	9400	< 1.0		< 0.01
"	13.3	8850	< 0.5		
"	8.4	17,700	< 0.5		
"	3.9	15,000	< 0.5		< 0.01
"	3.9	19,000	0.5	0.6	< 0.01
3/30	3.9	15,000			< 0.01
"	3.9	19,000			< 0.01
4/6	5.9	13,500	< 1.0		
4/8	14.2	1400	< 0.5		
"	13.7	2100	< 0.5		
"	13.3	2400	< 0.5		
"	12.7	3200	< 0.5		
"	15.3	1500	< 0.5		
"	16.0	2300	< 0.5		
4/14	14.6	1300	1.1	4.4	
"	16.0	5500	< 0.5		
"	16.3	500	0.7	2.0	
"	16.4	0	0.5	1.7	
"	16.5	2900	< 0.5		
"	16.7	1000	< 0.5		
"	18.1	0	< 0.5		
"	19.0	0	< 0.5		
4/16	16.3	9950	< 0.5		
"	14.8	8200	0.7	1.2	
"	13.5	7200	< 0.5		
"	13.6	7700	< 0.5		
"	15.3	4300	< 0.5		
"	17.1	2500	< 0.5		
"	16.0	3700	< 0.5		
"	15.4	1000	< 0.5		

Table 6

750-b

MERCURY SURVEY

Sample Analysis Results

Detroit River-Trenton Channel Area

Sample Collection Date	Location		Mercury Content		
	River Mile	Feet from U.S. Shore	Sediment (mg/kg) Wet Basis	Sediment (mg/kg) Dry Basis	Water (mg/l)
1970					
3/26	8.7	80	<1.0		< 0.01
3/27	13.1	20	28.0	86.0	
"	13.4	20	13.0	21.0	
"	13.2	20	10.0	16.0	
"	12.4	20	4.0	8.0	
"	3.9	2500	4.9	11.0	< 0.01
"	3.9	6500	< 0.5		< 0.01
3/30	3.9	2500			< 0.01
"	3.9	6500			< 0.01
3/31	13.2	20			< 0.01
"	13.1	20			< 0.01
"	13.3	20			0.03
4/1	13.4	20	2.0	3.0	
"	13.4	100	< 2.0		
"	13.2	20	5.0	7.0	
"	13.2	100	< 2.0		
"	13.1	20	25.0	82.0	
"	13.1	100	6.0	10.0	
"	13.1	200	< 2.0		
"	12.4	20	4.0	10.0	
"	12.4	200	< 2.0		
"	12.4	800	< 2.0		
"	12.4	1000	< 2.0		
"	13.9	0	< 2.0		
"	12.0	0	6.0	14.0	
4/3	13.2	20			<0.01
"	13.1	20			<0.01
"	12.4	20			<0.01
"	13.3	20			<0.01
"	12.8	20			<0.01
"	12.0	20			<0.01
"	11.3	50			<0.01
"	10.5	50			<0.01
"	9.8	50			<0.01
"	8.7	80			<0.01

752<

Table 6

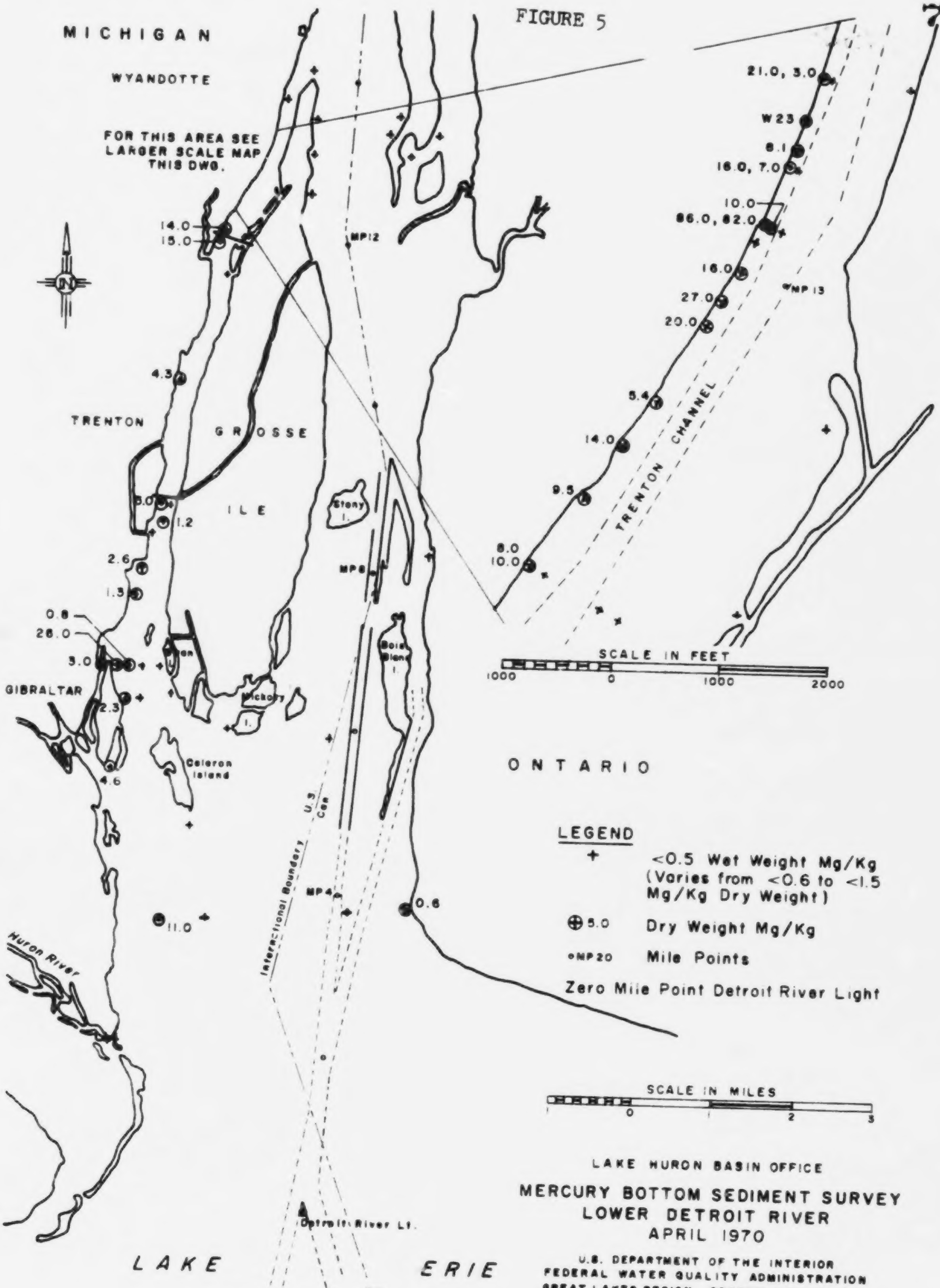
MERCURY SURVEY

Sample Analysis Results

Detroit River-Trenton Channel Area (cont.)

Sample Collection Date	Location		Mercury Content		
			Sediment (mg/kg)		Water
	River Mile	Feet from U.S. Shore	Wet Basis	Dry Basis	(mg/l)
1970					
4/6	8.7	80	1.9	5.0	
"	8.7	1240	< 1.0		
"	10.2	0	2.8	4.3	
"	7.9	300	1.7	2.6	
"	5.4	600	2.2	4.6	
"	4.7	6200	< 1.0		
"	5.8	7200	< 1.0		
"	12.0	20	7.1	15.0	
4/7	7.6	100	1.0	1.3	
"	6.7	150	11.0	26.0	
"	6.3	1200	< 1.0		
"	6.3	3400	< 1.0		
4/8	11.6	1150	< 0.5		
"	12.0	1850	< 0.5		
"	12.5	1850	< 0.5		
"	12.8	1500	< 0.5		
"	13.4	850	< 0.5		
4/16	8.6	600	0.9	1.2	
4/17	6.7	100	0.9	3.0	
"	6.7	1000	0.6	0.8	
"	6.7	2000	< 0.5		
"	6.7	3000	< 0.5		
"	6.3	150	1.5	2.3	
4/24	8.3	0	< 0.5		
4/26	13.0	20	< 0.5		
"	13.0	20	4.9	16.0	
"	12.9	20	12.0	27.0	
"	12.8	20	9.7	20.0	
"	12.7	20	2.4	5.4	
"	12.6	20	5.6	14.0	
"	12.5	20	4.3	9.5	
"	13.2	20	5.7	8.1	

FIGURE 5


MICHIGAN
WYANDOTTE
FOR THIS AREA SEE LARGER SCALE MAP THIS DWG.
N
14.0
15.0
MP12
4.3
TRENTON
GROSSE
ILE
5.0
1.2
2.6
1.5
0.8
26.0
3.0
GIBRALTAR
2.3
4.6
Celeron Island
Stony I.
Hickory I.
MP8
Bois Blanc I.
U.S. Chan
International Boundary
MP4
0.6
11.0
Huron River
Detroit River Lt.
21.0, 3.0
W23
8.1
16.0, 7.0
10.0
86.0, 82.0
16.0
MP13
27.0
20.0
5.4
14.0
TRENTON CHANNEL
9.5
8.0
10.0
SCALE IN FEET
1000
0
1000
2000
ONTARIO
LEGEND
+ <0.5 Wet Weight Mg/Kg (Varies from <0.6 to <1.5 Mg/Kg Dry Weight)
⊕5.0 Dry Weight Mg/Kg
MP20 Mile Points
Zero Mile Point Detroit River Light
SCALE IN MILES
1
0
1
2
3
LAKE
ERIE

LAKE HURON BASIN OFFICE

MERCURY BOTTOM SEDIMENT SURVEY
LOWER DETROIT RIVER
APRIL 1970

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER QUALITY ADMINISTRATION
GREAT LAKES REGION GROSSE ILE MICHIGAN

WESTERN BASIN OF LAKE ERIE, INCLUDING THE RAISIN AND MAUMEE RIVERS

The sampling of Lake Erie began on April 6, 1970, with bottom sediments collected at two stations near the mouth of the Huron River (Figure 6). From April 6 to April 27, 44 bottom sediment stations were sampled. Samples were collected in western Lake Erie, west of Pelee Island, with the majority of samples collected near the mouths of Michigan tributaries. Based on the measurable limit of 0.5 mg/kg wet weight, mercury was present at 16 of the 44 stations, although traces were present at most of the other stations (Table 7).

The Raisin River was sampled on two different dates at three stations (Figure 6). Traces of mercury were present; however, all results were less than the measurable limit (Table 8).

The Maumee River was sampled on April 17 at six stations (Figure 7), and traces of mercury were present at most stations; however, all results were less than the measurable limit (Table 9).

The 16 stations where mercury was present are located in the deepwater areas of the western basin of Lake Erie from the mouth of the Detroit River southward and eastward. Since shoreline and minor tributary samples did not contain appreciable amounts of mercury, the Detroit River appears to be the principal source, with mercury being deposited in the deeper quiescent parts of the lake.

756<

Table 7

MERCURY SURVEY

Sample Analysis Results

Lake Erie

Sample Collection Date 1970	Location Grid Coordinates		Mercury Content Sediment (mg/kg) Wet Basis	Dry Basis	Water (mg/1)
4/6	2.2N	2.6W	< 1.0		
"	2.0N	2.4W	< 1.0		
4/7	0.7N	1.3W	1.0	1.8	
"	0.0N	0.6W	1.0	1.8	
"	1.3S	4.2W	< 0.5		
"	2.0S	3.2W	< 0.5		
"	2.9S	2.2W	< 1.0		
"	3.7S	4.8W	< 0.5		
4/10	2.8S	5.8W	< 0.5		
"	4.3S	8.3W	< 0.5		
"	5.0S	6.4W	< 0.5		
"	5.4S	9.5W	< 0.5		
"	9.6S	11.6W	0.6	0.8	
4/14	17.4S	2.4E	0.5	1.6	
"	0.5N	3.2E	< 0.5		
"	5.1S	2.0W	0.5	1.0	
"	8.7S	2.9E	< 0.5		
"	9.4S	5.7W	0.8	1.8	
"	10.7S	6.7E	< 0.5		
"	16.5S	9.4W	< 0.5		
"	17.4S	5.8W	< 0.5		
4/15	11.2S	10.3W	< 0.5		
"	1.3S	2.9W	0.8	1.0	
"	4.3S	4.9W	< 0.5		
"	8.6S	8.1W	< 0.5		
"	14.8S	13.1W	< 0.5		
"	21.3S	7.1W	< 0.5		
"	23.6S	3.5W	< 0.5		
"	24.8S	1.2E	< 0.5		
4/25	6.0S	0.0	0.7	1.1	
"	10.0S	0.0	0.6	1.7	
"	14.0S	0.0	0.6	2.1	
"	14.0S	8.0E	< 0.5		
"	20.0S	0.0	0.5	1.7	
"	20.0S	8.0E	< 0.5		
"	24.0S	14.0E	< 0.5		
4/27	2.4N	0.4E	1.0	1.8	
"	0.3N	0.0E	1.0	2.1	
"	4.0S	8.0E	0.9	2.7	
"	4.0S	14.0E	0.5	1.3	
"	4.0S	20.0E	0.5	1.5	
"	14.0S	20.0E	< 0.5		
"	20.0S	20.0E	< 0.5		
"	16.0S	14.0E	< 0.5		

Table 8

MERCURY SURVEY

Sample Analysis Results

River Raisin

Sample Collection Date	Location		Mercury Content		
			Sediment (mg/kg)		Water
	Grid Coordinates	River Mile	Wet Basis	Dry Basis	(mg/l)
1970					
4/10	7.6S 9.8W	-0.5	< 0.5		
3/30	Consolidated Paper(S) W154	1.7	< 0.5		< .01
3/30	Mason Run at Ford Bridge W171	1.3-0.1	< 0.5		< .01

758<

FIGURE 6

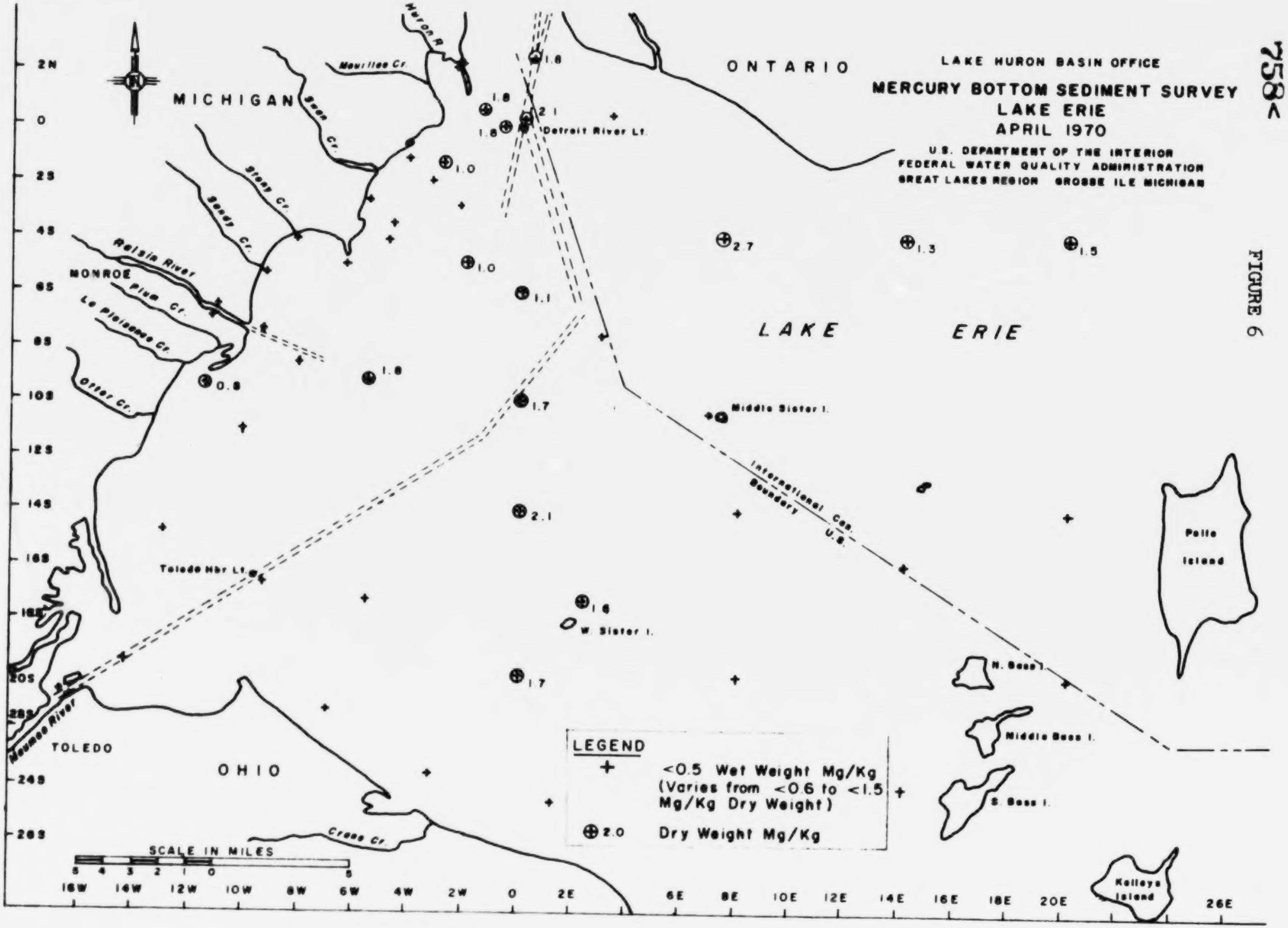

LAKE HURON BASIN OFFICE
MERCURY BOTTOM SEDIMENT SURVEY
LAKE ERIE
APRIL 1970
U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER QUALITY ADMINISTRATION
GREAT LAKES REGION GROSSE ILE MICHIGAN
ONTARIO
MICHIGAN
OHIO
LAKE ERIE
Huron R.
Mouillee Cr.
Swan Cr.
Stony Cr.
Sandy Cr.
Raisin River
MONROE
Plum Cr.
La Plaisance Cr.
Otter Cr.
Maumee River
TOLEDO
Crane Cr.
Detroit River Lt.
Toledo Hbr Lt.
Middle Sister I.
W. Sister I.
International Can. Boundary U.S.
Pelee Island
N. Bass I.
Middle Bass I.
S. Bass I.
Kelleys Island
1.8
1.8
2.1
1.8
1.0
1.0
1.1
1.8
0.8
1.7
2.7
1.3
1.5
2.1
1.6
1.7
LEGEND
+ <0.5 Wet Weight Mg/Kg (Varies from <0.6 to <1.5 Mg/Kg Dry Weight)
⊕ 2.0 Dry Weight Mg/Kg
SCALE IN MILES
5 4 3 2 1 0 5
2N
0
2S
4S
6S
8S
10S
12S
14S
16S
18S
20S
22S
24S
26S
16W
14W
12W
10W
8W
6W
4W
2W
0
2E
6E
8E
10E
12E
14E
16E
18E
20E
26E

Table 9

MERCURY SURVEY

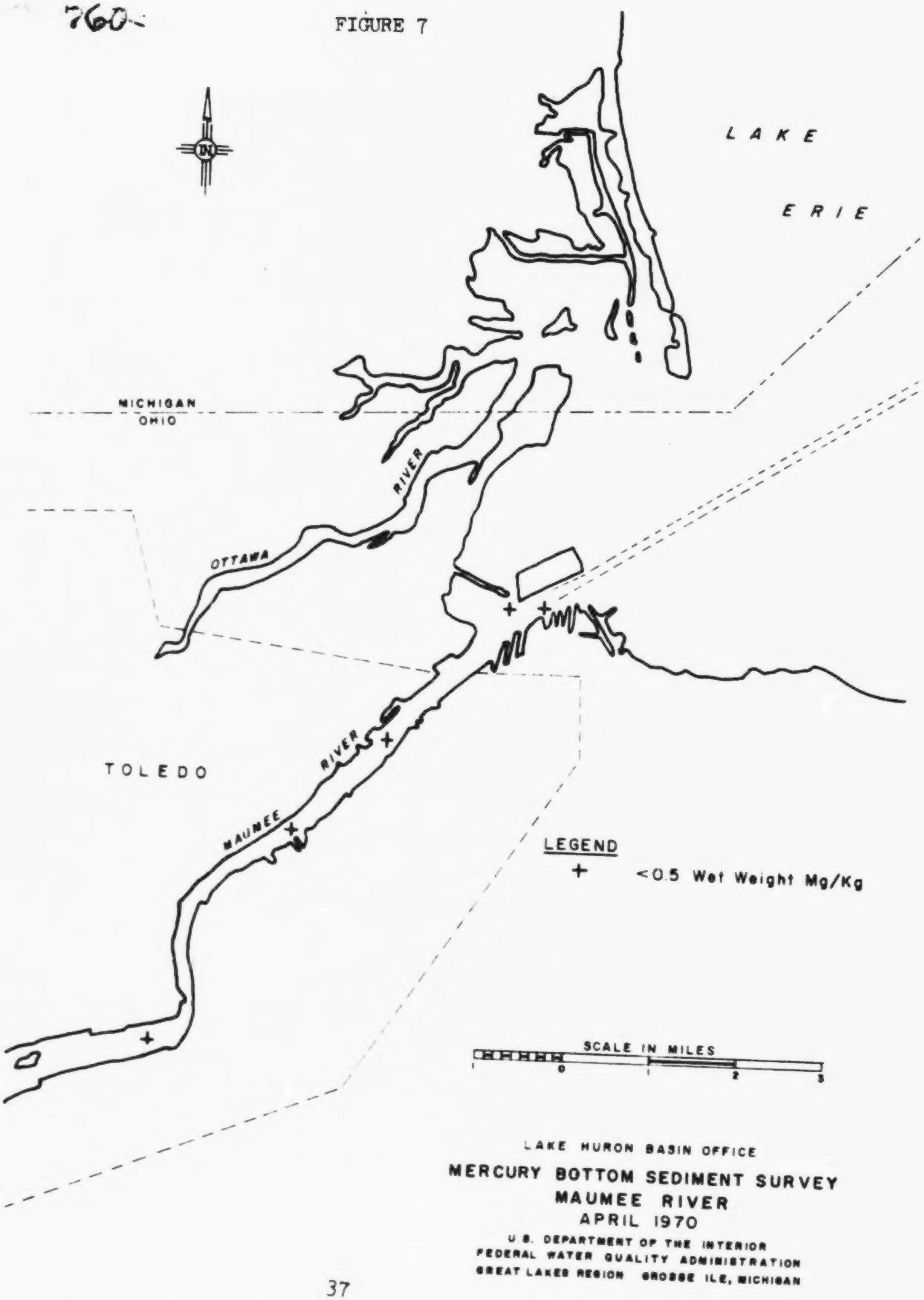
Sample Analysis Results

Maumee River

Sample Collection Date	Location		Mercury Content Sediment (mg/kg)		Water
	Grid Coordinates	River Mile	Wet Basis	Dry Basis	(mg/l)
1970					
4/17		0.5	< 0.5		
"		0.0	< 0.5		
"		2.1	< 0.5		
"		5.1	< 0.5		
"		6.9	< 0.5		
"	19.6S 14.5W		< 0.5		

760-

FIGURE 7


LAKE
ERIE
MICHIGAN
OHIO
OTTAWA
RIVER
TOLEDO
MAUMEE
RIVER
SCALE IN MILES
0
1
2
3

LEGEND

+ <0.5 Wet Weight Mg/Kg

LAKE HURON BASIN OFFICE

MERCURY BOTTOM SEDIMENT SURVEY
MAUMEE RIVER
APRIL 1970

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER QUALITY ADMINISTRATION
GREAT LAKES REGION GROSSE ILE, MICHIGAN

MERCURY ANALYSES
IN THE EASTERN PORTION OF THE
LAKE ERIE BASIN

As part of its mercury investigations in the Lake Erie Basin, the Federal Water Quality Administration Lake Erie Basin Office analyzed bottom sediments from the downstream portions of south shore tributaries and from the lake bottom. Tables 10 and 11 include results from the sediment and water analyses to 5-12-70 except those made at the Detrex Chemical Corp. plant. Detrex analyses are listed in a special report on that plant (Appendix II).

At the Lake Erie Basin Office the lower limit of measurability of mercury in sediments is 1 mg/kg and in water 0.002 mg/l.

The states of Ohio, Pennsylvania, and New York report no measurable mercury in any water supply intakes within this area.

762<

Table 10

LAKE ERIE BASIN OFFICE

MERCURY ANALYSES - WATER

Station No.	Location	Date 1970	Mercury* mg/1
12	Diamond Shamrock, Painesville		
	Influent	4/10	<0.002
	Hydro discharge to Grand River	4/10	0.010
	North sewer to Lake Erie	4/10	<0.002
14	1.59 mi. Ashtabula River (Norfolk and Western RR bridge)	4/17	<0.002
15	1.95 mi. Fields Brook (Columbus Rd. bridge)	4/17	<0.002
	Euclid, Ohio STP	5/11	0.004
	Cleveland Southerly STP	5/12	0.004
	Cleveland Westerly STP	5/12	0.003
	Cleveland Easterly STP	5/6	< 0.002
	Mile 1.0 West Branch Ashtabula River 200' downstream from titanium plant	5/5	< 0.002
	General Electric, Nela Park, Cleveland - Discharge 3 gals every two weeks		1.060

---

*0.01 mg/1 is the lowest sensitivity of test

Table 11

LAKE ERIE BASIN OFFICE

MERCURY ANALYSES - SEDIMENT

Dry Weight Basis

Station No.	Location	Date	Mercury* mg/kg
1	0.53 mi. Portage River (Rt. 2 bridge)	4/14	< 1
2	0.0 mi. Sandusky River	4/14	< 1
3	Tributaries emanating from NASA-Plumbrook		
	PB-1 (Plum Brook)	4/10	< 1
	PB-2 (No Name Creek)	4/10	< 1
	PB-3 (East Branch, Pipe Creek)	4/10	< 1
4	0.61 mi. Black River (Rt. 2 bridge)	4/13	8
5	8.13 mi. Rocky River	4/22	< 1
6	10.0 mi. Rocky River (NASA - Brookpark)	4/14	< 1
7	4.27 mi. Cuyahoga River (Norfolk & Western RR Bridge)	4/10	< 1
8	C33-8 (100 ft. North of Cleveland Easterly STP outfall)	4/13	4
9	D24-1 (50 ft. North of E. 222nd St - Babbitt Rd. sewer outfalls- Euclid, O.)	4/13	2
10	Tributary to Chagrin River (General Biochemical plant)		
	#1 (200 ft. downstream from plant outfall)	4/10	< 1
	#2 (at plant outfall)	4/10	< 1
11	2.85 mi. Grand River (St. Clair St. bridge)	4/10	< 1
13	0.76 mi. Ashtabula River (East 5th St. bridge)	4/15	2
15	1.95 mi. Fields Brook (Columbus RR bridge)	4/10	< 1
16	No Name Ditch East of Ashtabula (Rt 531 bridge)	4/13	8
17	J41-1 (Presque Isle Bay)	4/20	< 1

* 1 mg/kg is the lowest sensitivity of test

763-a

Table 11

LAKE ERIE BASIN OFFICE (cont'd)

MERCURY ANALYSES - SEDIMENT

Dry Weight Basis

Station No.	Location	Date	Mercury* mg/kg
18	G33-12 (20 ft. north of Detrex-Linde lakefront outfall)	4/20 4/23	< 1 < 1
19	G33-13 (80 ft. north of Detrex-Linde lakefront outfall)	4/20 4/23	< 1 < 1
20	123-2 (6 mi. north of Ashtabula)	4/22	< 1
21	H34-2 (6,600 ft., 38°T from Detrex-Linde outfall)	4/22	< 1
22	H34-1 (7,000 ft., 35°T from Detrex-Linde outfall)	4/22	< 1
23	H33-7 (5,600 ft., 20°T from Detrex-Linde outfall)	4/22	< 1
24	5,000 ft. north of Detrex-Linde outfall (H33-8)	4/23	< 1
25	3 mi., 56°T from Detrex-Linde outfall (H34-5)	4/23	< 1
26	4-3/4 mi., 61°T from Detrex-Linde outfall (H34-6)	4/23	< 1
27	2 miles ENE of Conneaut (H36-20)	4/24	< 1
28	Mouth of Ashtabula River (A-4)	4/28	< 1
29	0.96 miles Ashtabula River (A-3)	4/28	< 1
30	600 ft. north of mouth of Grand River (G-5)	4/28	< 1
31	0.50 miles Grand River (G-4)	4/28	< 1
32	Mouth of Black River (B-4)	4/28	< 1
33	1.0 miles Black River (B-3)	4/28	< 1

---

* 1 mg/kg is the lowest sensitivity of test

763-b

Table 11

LAKE ERIE BASIN OFFICE (concl'd)

MERCURY ANALYSES - SEDIMENT

Dry Weight Basis

Station No.	Location	Date	Mercury* mg/kg
34	37-1/4 mi., 7°T from Cleveland (123-1) Core length		
	0-4 inches	8/20/69	< 1
	4-8 inches	8/20/69	< 1
	4-12 inches	8/20/69	< 1
	16-20 inches	8/20/69	< 1
35	Composite of benthic organisms obtained from Kelleys Island Shoal and Starve Island Reef	4/15	< 1
	RM 0.0 Buffalo River	5/6/70	4
	RM 4.3 Buffalo River	5/6/70	1
	RM 0.0 Maumee River	4/28/70	< 1
	RM 1.5 Maumee River	4/28/70	< 1
	S-2 Sandusky Bay - 3 miles 310° true from Sandusky Court House	4/29/70	< 1
	S-7 Sandusky Bay - 1.2 miles 10° true from Sandusky Court House	4/29/70	< 1
	RM 0.4 Cuyahoga River	4/29/70	< 1
	C-6 400 feet NW of Cuyahoga River Mouth	4/29/70	< 1

---

* 1 mg/kg is the lowest sensitivity of test

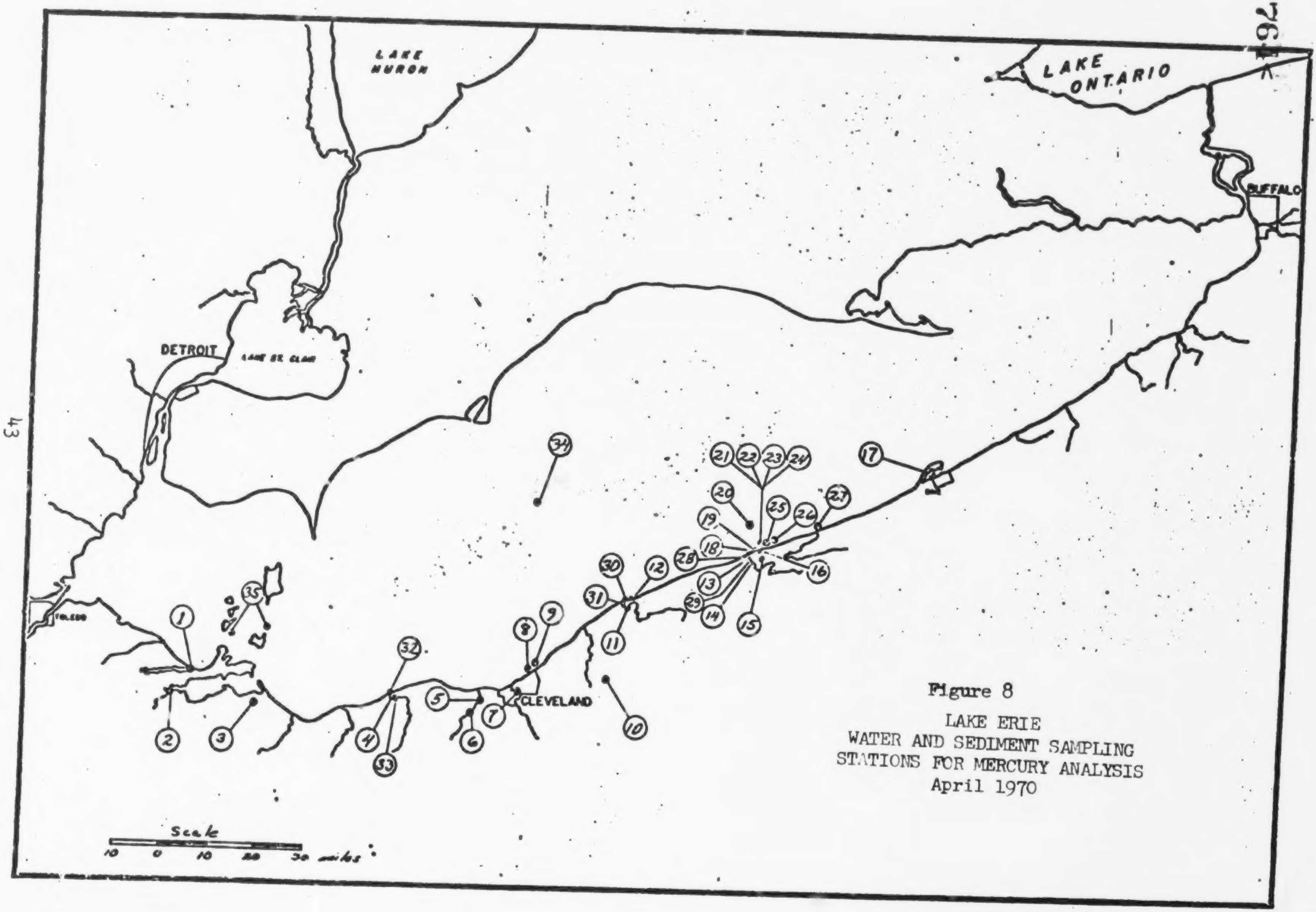

LAKE HURON
LAKE ONTARIO
BUFFALO
DETROIT
LAKE ST. CLAIR
TOLEDO
CLEVELAND
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
Scale
10 0 10 20 30 miles

Figure 8

LAKE ERIE
WATER AND SEDIMENT SAMPLING
STATIONS FOR MERCURY ANALYSIS
April 1970

HEAVY METALS IN THE LAKE ERIE BASIN

As part of the investigations in the Lake Erie Basin, the FWQA, National Field Investigations Center analyzed bottom sediments from various shore areas and tributaries. The results of analyses for ten heavy metals are listed in Table 12 and the sample locations are shown on Figures 9, 10, and 11. Stations were selected in the mouth of tributaries and immediately off-shore.

Heavy metals are toxic to aquatic bottom organisms and fish when present in sufficient concentrations. Combinations of some of these metals such as copper and zinc have a total toxicity greater than the sum of the toxicities of each metal taken independently. Metals such as iron oxides precipitate in water and may blanket the bottom and smother bottom organisms. Toxic metals in bottom muds can be made available to the overlying water by physical, chemical or biological means. Metals may re-enter the overlying water by scouring of the stream bed because of velocity increases, by wave action, or other water turbulences. These metals may also be resolubilized by the waterbody dependent upon environmental conditions such as pH, temperature and concentrations of other metals present. Some of these metals may also be detrimental to aquatic organisms when concentrated in the food web.

National Field Investigations
Center
Office of Enforcement &
Standards Compliance, FWQA

SEDIMENTS

Table 12

DRY WEIGHT BASIS

SAMPLE DESIGNATION	Mg mg/kg	Cr mg/kg	Pb mg/kg	Ni mg/kg	Hg mg/kg
19747 -- 5/6/70 Detroit River Lt. 29	18,800	30	59	20	1.4
19748 -- 5/6/70 Detroit River (Lake Erie) Detroit River Light (RM - 0.0)	22,400	190	160	100	2.9
19749 -- T.83 Monroe, Raisin River Turning Basin (RM - 1.6)	14,400	60	150	50	< 1.0
19750 -- Monroe Navigation Channel B-7 Lake Erie 8.1 S - 8.7 W	14,900	200	150	100	3.0
19751 -- 19.6S 14.5 W-Hg 33-Lake Erie, Toledo, (Lt. 38-BC 37) Mouth Maumee River	15,000	24	34	40	< 1.0
19752 -- Hg 36, Second R R Bridge, Maumee River (RM - 2.1)	12,600	100	140	50	< 1.0
19755 -- Hg 54, Mouth Ecorse Creek in Detroit River (RM - 16.4)	18,900	540	900	230	< 1.0
19756 -- Hg 3 - RM 13.1 - Detroit River	20,000	170	160	170	4.4
19757 -- Hg 57 - Detroit River - North of Nicholson Dock (RM - 18.1)	15,000	99	110	80	6.0
19758 -- Hg 129 - Mouth of Rouge River (RM - 19.4-0.1)	16,700	26	54	30	< 1.0
19759 -- R-104, Head of Detroit River, (RM 30.8)	18,600	9	22	10	< 1.0
4/16/70 -- B-4 - Mouth of Black River	8,100	68	82	40	< 1.0
4/14/70 -- A-4 - Mouth of Ashtabula River	7,800	910	79	60	1.1

DRY WEIGHT BASIS

SEDIMENTS

(Table 12 Cont'd)

National Field Investigations
Center
Office of Enforcement &
Standards Compliance, FWQA

SAMPLE DESIGNATION	Mn mg/kg	Fe mg/kg	Cu mg/kg	Zn mg/kg	Cd mg/kg
19747 -- 5/6/70 Detroit River Lt. 29	1,300	14,100	36	150	< 30
19748 -- 5/6/70 Detroit River (Lake Erie) Detroit River Light (RM - 0.0)	510	36,500	140	600	< 30
19749 -- T.33 Monroe, Raisin River Turning Basin (RM - 1.6)	540	23,300	58	360	< 30
19750 -- Monroe Navigation Channel B-7 Lake Erie 8.1 S - 8.7 W	570	32,000	160	500	< 30
19751 -- 19.6S 14.5 W-Hg 33-Lake Erie, Toledo, (Lt. 38-BC 37) Mouth Maumee River	410	17,800	27	96	< 30
19752 -- Hg 36, Second R R Bridge, Maumee River (RM - 2.1)	590	35,600	79	330	< 30
19755 -- Hg 54, Mouth Ecorse Creek in Detroit River (RM - 16.4)	780	56,900	290	1,300	< 30
19756 -- Hg 3 - RM 13.1 - Detroit River	700	28,800	130	440	< 30
19757 -- Hg 57 - Detroit River - North of Nicholson Dock (RM - 18.1)	440	36,800	79	430	< 30
19758 -- Hg 129 - Mouth of Rouge River (RM - 19.4-0.1)	440	13,800	41	110	< 30
19759 -- R-104, Head of Detroit River, (RM 30.8)	530	6,900	9	35	< 30
4/16/70 -- B-4 - Mouth of Black River	490	30,600	78	340	< 30
4/14/70 -- A-4 - Mouth of Ashtabula River	700	33,300	44	300	< 30

DRY WEIGHT BASIS

SEDIMENTS

(Table 12 Con'd)

National Field Investigations
Center
Office of Enforcement &
Standards Compliance, FWQA

SAMPLE DESIGNATION	Mg mg/kg	Cr mg/kg	Pb mg/kg	Ni mg/kg	Hg mg/kg
4/15/70 -- C-6 - Cleveland Harbor - 400' NNW of Cuyahoga R. mouth	7,400	200	340	60	< 1.0
4/15/70 -- G-5 - Fairport Harbor, 700' North of Grand River mouth	7,300	210	51	30	2.0
4/30/70 -- J41-1 - Presque Isle Bay, 1 mile 257^{0} true from foot of State street public dock, Erie, Pa.	8,600	110	200	50	1.1
5/6/70 -- Mouth of Buffalo River (RM - 0.0)	11,200	260	420	40	2.6
4/16/70 -- S-7 - Sandusky Bay - 1.2 miles 10^{0} true from Sandusky Court House	11,800	33	62	20	< 1.0
5/5/70 -- Dunkirk - 3 mile north of Dunkirk Harbor entrance light	10,300	67	100	50	< 1.0
5/4/70 -- Lake Erie Station C-15-1 of Vermillion 5 miles north	10,800	67	97	40	< 1.0
5/4/70 -- Lake Erie, 1 mile north of Vermillion	17,300	20	73	30	< 1.0
5/11/70 -- C 23-9 - 2 miles at 53^{0} true from Cleveland east entrance light	76,39	36	64	20	< 1.0
5/11/70 -- C 22-73 - 3.25 miles north of Cleveland Harbor light	40,100	31	85	20	2.4
WATER	mg/l	mg/l	mg/l	mg/l	mg/l
Detrex # 1 -- Sump Effluent 5/11/70	9.9	< 0.08	< 0.05	< 0.05	0.017
Detrex # 4 - 5/11/70 Lake Erie, Linde outfall to Erie	9.1	< 0.08	< 0.05	< 0.05	0.004

DRY WEIGHT BASIS

SEDIMENTS

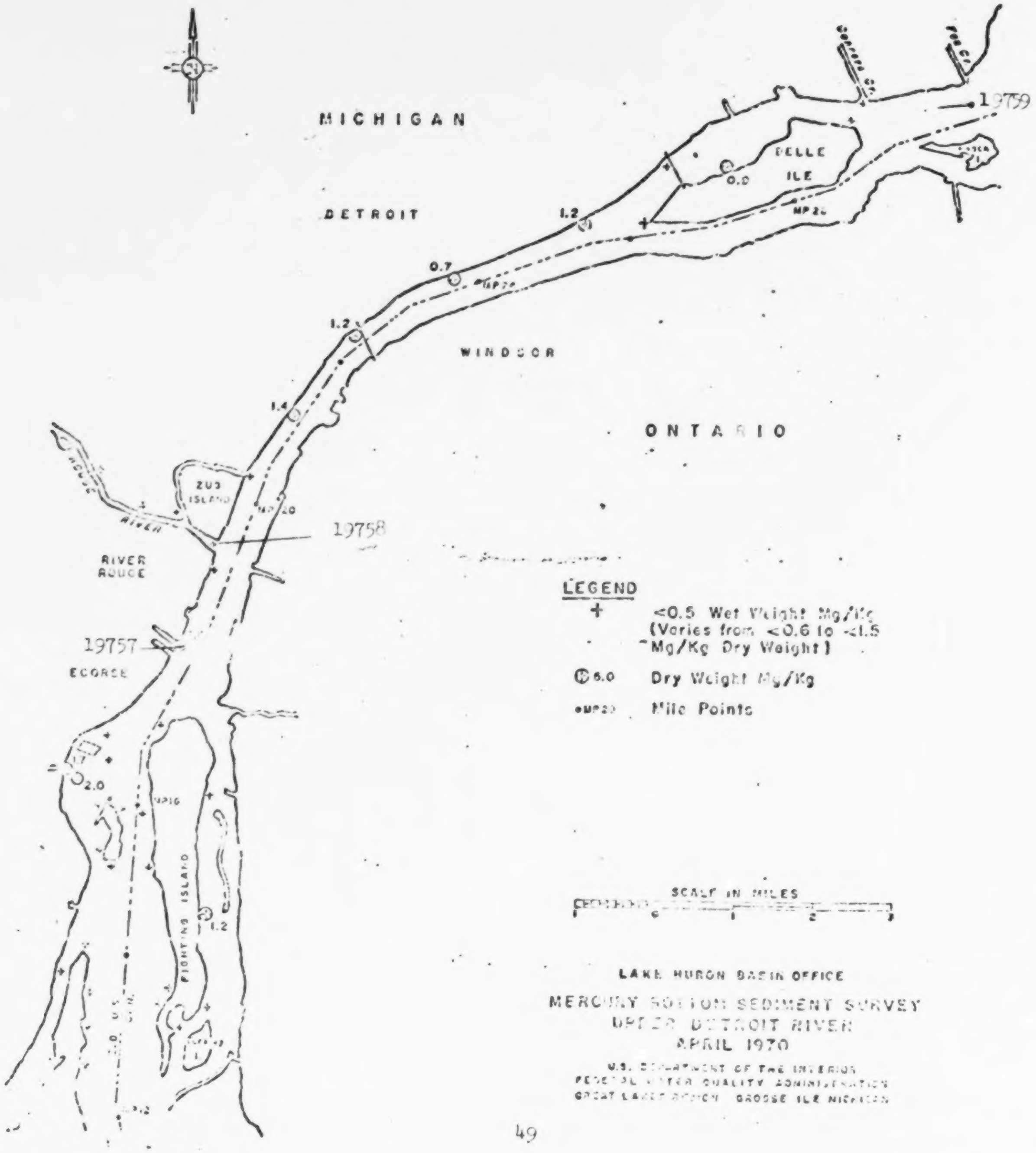
(Table 12 Concluded)

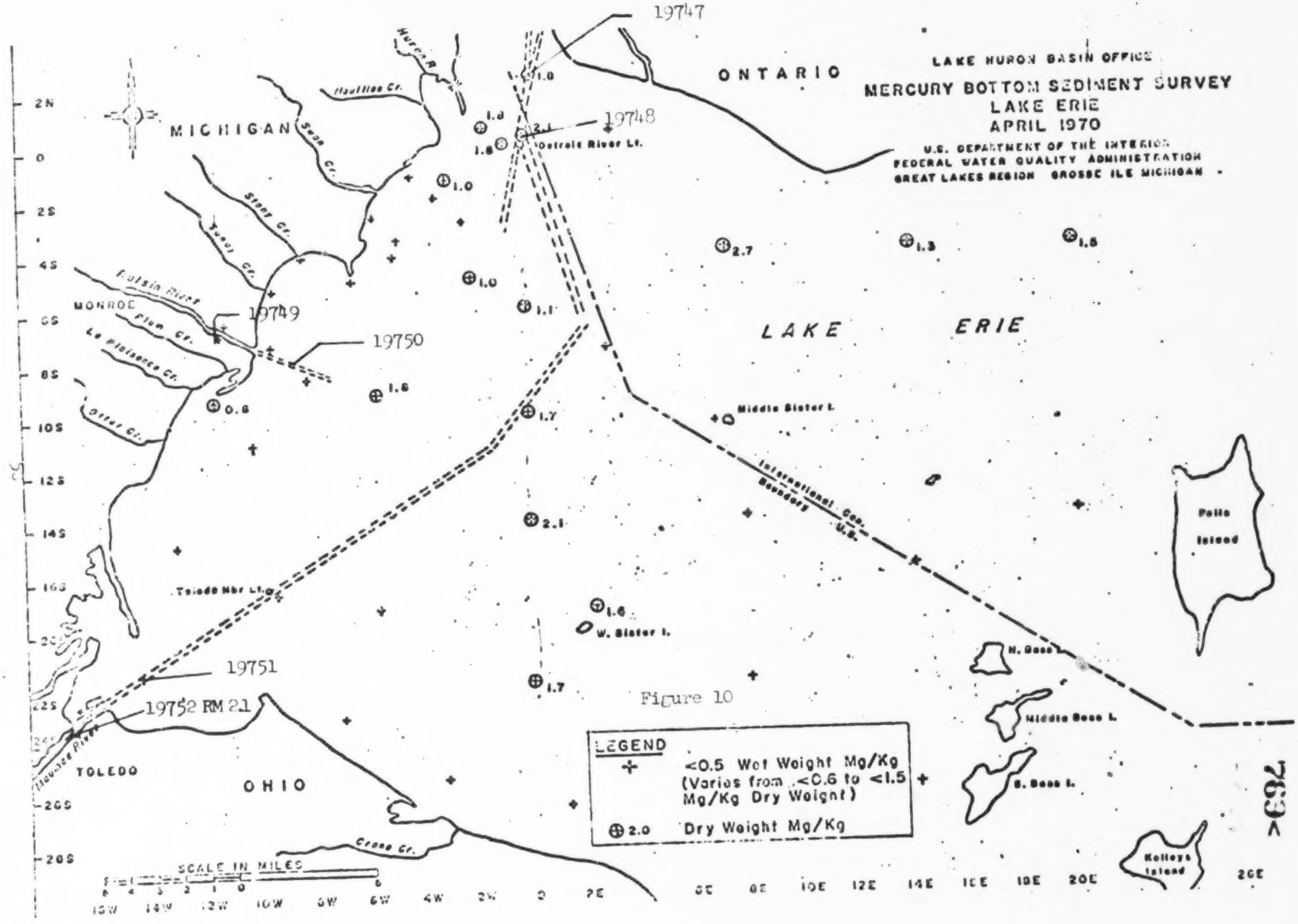
National Field Investigations
Center
Office of Enforcement &
Standards Compliance, FWQA

SAMPLE DESIGNATION	Mn mg/kg	Fe mg/kg	Cu mg/kg	Zn mg/kg	Cd mg/kg
4/15/70 -- C-6 - Cleveland Harbor - 400' NNW of Cuyahoga R. mouth	730	46,300	150	1,200	< 30
4/15/70 -- G-5 - Fairport Harbor, 700' North of Grand River mouth	420	28,800	34	240	< 30
4/30/70 -- J41-1 - Presque Isle Bay, 1 mile 257° true from foot of State street public dock, Erie, Pa.	530	41,400	140	550	< 30
5/6/70 -- Mouth of Buffalo River (RM - 0.0)	730	48,200	210	1,200	< 30
4/16/70 -- S-7 - Sandusky Bay - 1.2 miles 10° true from Sandusky Court House	630	26,900	49	160	< 30
5/5/70 -- Dunkirk - 3 mile north of Dunkirk Harbor entrance light	610	33,100	57	390	< 30
5/4/70 -- Lake Erie Station C-15-1 of Vermillion 5 miles north	510	32,600	61	250	< 30
5/4/70 -- Lake Erie, 1 mile north of Vermillion	470	32,500	32	140	< 30
5/11/70 -- C 23-9 - 2 miles at 53° true from Cleveland east entrance light	490	28,900	36	200	< 30
5/11/70 -- C 22-73 - 3.25 miles north of Cleveland Harbor light	520	30,700	39	260	< 30
WATER	mg/1	mg/1	mg/1	mg/1	mg/1
Detrex # 1 -- Sump Effluent 5/11/70	< 0.05	0.2	< 0.06	< 0.2	< 0.2
Detrex # 4 - 5/11/70 Lake Erie, Linde outfall to Erie	< 0.05	0.1	< 0.06	< 0.2	< 0.2

768<

Figure 9


MICHIGAN
DETROIT
WINDSOR
ONTARIO
BELLE ILE
0.0
MP 24
1.2
0.7
MP 22
1.2
1.4
ZUG ISLAND
MP 20
ROUGE RIVER
RIVER ROUGE
ECORSE
2.0
MP 18
FIGHTING ISLAND
1.2
19759
19758
19757
LEGEND
+ <0.5 Wet Weight Mg/Kg (Varies from <0.6 to <1.5 Mg/Kg Dry Weight)
6.0 Dry Weight Mg/Kg
MP 20 Mile Points
SCALE IN MILES
0
1
2
3
LAKE HURON BASIN OFFICE
MERCURY BOTTOM SEDIMENT SURVEY
UPPER DETROIT RIVER
APRIL 1970
U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER QUALITY ADMINISTRATION
GREAT LAKES REGION GROSSE ILE MICHIGAN



LAKE HURON BASIN OFFICE
MERCURY BOTTOM SEDIMENT SURVEY
LAKE ERIE
APRIL 1970
U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER QUALITY ADMINISTRATION
GREAT LAKES REGION GROSSE ILE MICHIGAN

ONTARIO
MICHIGAN
OHIO
LAKE ERIE
TOLEDO
MONROE
Huron R.
Swan Cr.
Stony Cr.
Raisin River
Plum Cr.
La Plaisance Cr.
Otter Cr.
Crane Cr.
Maumee River
Detroit River Lt.
Toledo Hbr Lt.
Middle Sister I.
W. Sister I.
International Bdy.
Canada
U.S.
Pelee Island
N. Bass I.
Middle Bass I.
S. Bass I.
Kelleys Island
1.0
1.3
2.1
1.8
1.0
1.0
1.1
2.7
1.3
1.5
1.6
0.6
1.7
2.1
1.6
1.7
19747
19748
19749
19750
19751
19752 RM 21
2N
0
2S
4S
6S
8S
10S
12S
14S
16S
20S
22S
26S
28S
16W
14W
12W
10W
8W
6W
4W
2W
0
2E
6E
8E
10E
12E
14E
16E
18E
20E
26E
SCALE IN MILES
LEGEND
<0.5 Wet Weight Mg/Kg (Varies from <0.6 to <1.5 Mg/Kg Dry Weight)
2.0 Dry Weight Mg/Kg

Figure 10

763<

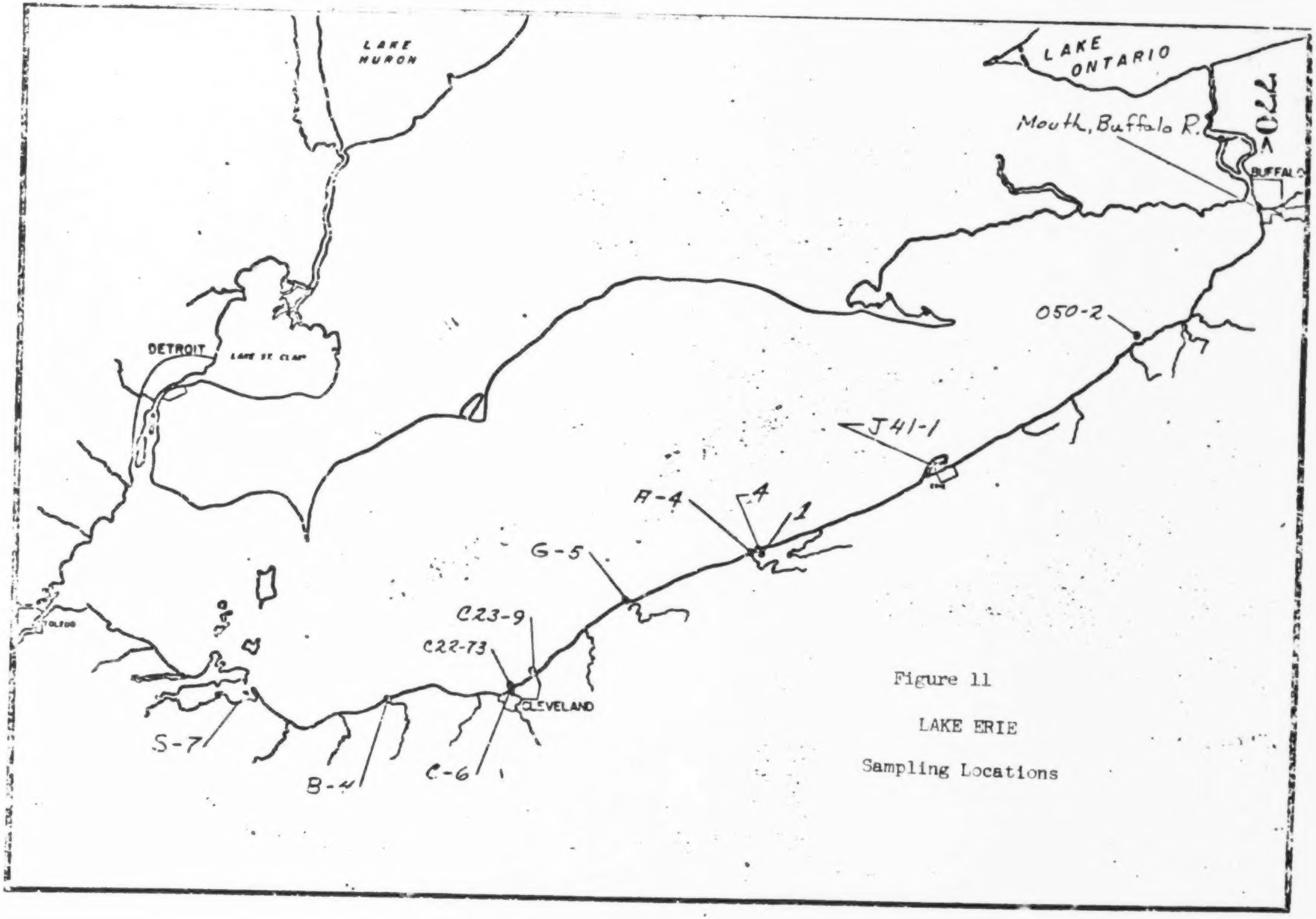

LAKE HURON
LAKE ONTARIO
770<
Mouth, Buffalo R.
BUFFALO
DETROIT
LAKE ST. CLAIR
O50-2
J41-1
A-4
A
1
G-5
C23-9
C22-73
CLEVELAND
C-6
B-4
S-7
TOLEDO

Figure 11

LAKE ERIE

Sampling Locations

APPENDIX I

REPORT ON WYANDOTTE
CHEMICALS CORPORATION,
WYANDOTTE, MICHIGAN

772<

Investigation of Wyandotte Chemicals Corp.

Following the discovery of mercury in fishes caught in Canadian waters, the State of Michigan reviewed the mercury-using industries in the State and found that the Wyandotte Chemicals Corporation of Wyandotte, Michigan was a major user of mercury. The Michigan Water Resources Commission, after consultations with the Wyandotte Chemicals Corp., gave the following information to the Lake Huron Basin Office of the Federal Water Quality Administration.

The mercury cell operation at Wyandotte consumes an average of 80 pounds per day of mercury, of which approximately 10 to 20 pounds per day is discharged to the river. Wyandotte Chemicals bases their estimate of 10 to 20 pounds per day on composite samples collected and composited for three 8-hour periods each day. The pounds per day figures given for FWQA sampling generally indicate higher values. However, FWQA conducted grab sampling operations at the point of discharge to the river which are generally not directly comparable with composite figures when there is variation in concentration of waste throughout the day. It was also discovered from consultations with Wyandotte Chemicals that concentration varies throughout the cross section of the discharge flume. The Lake Huron Basin Office began sampling the effluent from Wyandotte Chemicals on March 27, 1970. The results are given in the following table:

Effluent Samples by FWQA from Wyandotte Chemicals Corp.
(Outfall Code W23)

Date	Day	Mercury Content (mg/l as Hg)		Approx. Loading (lbs/day)
		AM	PM	
March 27	F	.10		11
30	M		.32	36
31	T	.66		74
April 3	F	.33	.23	31
6	M	.24	.11	18
7	T	.14	.40	30
8	W	.11	.11	12
9	T		.32	36
10	F	.12	< .01 (effluent from mercury cells diverted to temporary treatment pond at 1230)	

April 3 - Wyandotte Chemicals was called into the Michigan Water Resources Commission office and proposed a system of treatment which was tentatively approved by the State agency. Construction began immediately Effluent pipes at the mercury cell were blocked up and a temporary above-ground piping system has been installed from that point to a large concrete-lined containment area which had formerly been used for storage of limestone. An earth dike was used to form a reaction pond area at the south end of the pond, the remainder of the pond being used as a settling area. Weak cell liquor was introduced to the pipeline to keep the pH above normal. An estimated 600 gallons per minute of mercuric chloride waste from the mercury cell was then discharged through the pipeline to a baffled timber mixing box before discharge to the reaction pond. NaHS and spent sulfuric acid were added at the mixing box before discharge to the reaction pond. After about six hours retention in the reaction pond, the effluent discharges through another mixing box to the settling pond, at which point cell liquor is added to bring the pH to neutral. In the settling pond, mercuric sulfide is precipitated which removes approximately 80 to 90 percent of mercury. The discharge from this pond was then discharged to a larger sewer which contained other wastes from the plant and then discharged to the Detroit River.

April 10 - The above system was placed in operation. All waste from the mercury cell was diverted into the pond system. There was no detectable discharge to the river, as indicated in the following table:

Date	Day	Mg/l as Hg		Approx. lbs/day
		AM	PM	
April 13	M		<.005	0
14	T	<.005	<.005 (pond filled, treated effluent discharging to sewer at 1930)	0

April 15-16 - Waste discharged to the river through the temporary treatment system contained approximately two pounds of mercury/day.

Date	Day	Mg/l as Hg		Approx. lbs/day
		AM	PM	
April 15	W	.006	.026	1.8
16	T	.027	<.005 (plant shut down by State of Michigan-temporary injunction at 1620)	1.4
17	F		.023	2.6
18	S	<.005		0
19	S	<.005		0
20	M	<.005	<.005	0
21	T	.008	.005	.7
22	W	<.005		0
23	T	<.005	<.005	0
24	F	.015	.018	1.8

(Losses from W-23 on 4/24 and other minor losses since are verified by Wyandotte Chemicals thru MWRC. No explanation can be found. Wyandotte Chemicals is conducting an intensive cleanup of all piping, valving building areas, etc., around the mercury cell operation to prevent further losses.)

We can probably expect small losses from accumulations of 30 years of use. Storm runoff from roof and grounds may also contribute.)

Date	Day	Mg/l as Hg AM	Mg/l as Hg PM	Approx. lbs/day
April 25	S	.010	.006	0.9
26	S	<.005	.005	Tr

(Operation of mercury cell process was resumed. State of Michigan approved a plan of operation in which mercury waste is treated in settling ponds, then discharged to brine caverns on Grosse Ile. This is a closed system; brine is pumped from the cavern to Wyandotte Chemicals for use in their processes.)

April 27	M	.007	<.005	Tr
28	T	.005	<.005	Tr
29	W	<.005	<.005	0
30	T	<.005	<.005	0
May 1	F	<.002	<.002	0
4	M	<.002		0
5	T	<.002		0
6	W	.003		.3
7	T	<.002		0
8	F	.003		.3
11	M	<.002		0
12	T	<.002		0
13	W	<.002		0
14	T	<.002		0
15	F	<.002		0
19-22		<.002		0

Tr = Trace amounts

April 16 - Inspection of emergency facilities at Wyandotte Chemicals Plant. L. B. O'Leary, Director of the Lake Huron Basin Office, Federal Water Quality Administration, and W. E. Denniston, District Engineer, Michigan Water Resources Commission, toured the mercury cell and waste treatment operations of Wyandotte Chemicals Corporation accompanied by Mr. J. Hunter, waste control chemist of Wyandotte Chemicals.

The waste treatment operation for the effluent containing mercury is shown on the accompanying sketches.

All waste from the mercury cell operation, including floor drains, is intercepted before it reaches the river and pumped through temporary above-ground piping systems to the waste pond.

The waste pond is a concrete-lined depression formerly used for limestone storage. Earth dikes divide the pond into two areas; the smaller portion in the south end of the pond is used as a reaction area, and the remainder is used as a settling pond.

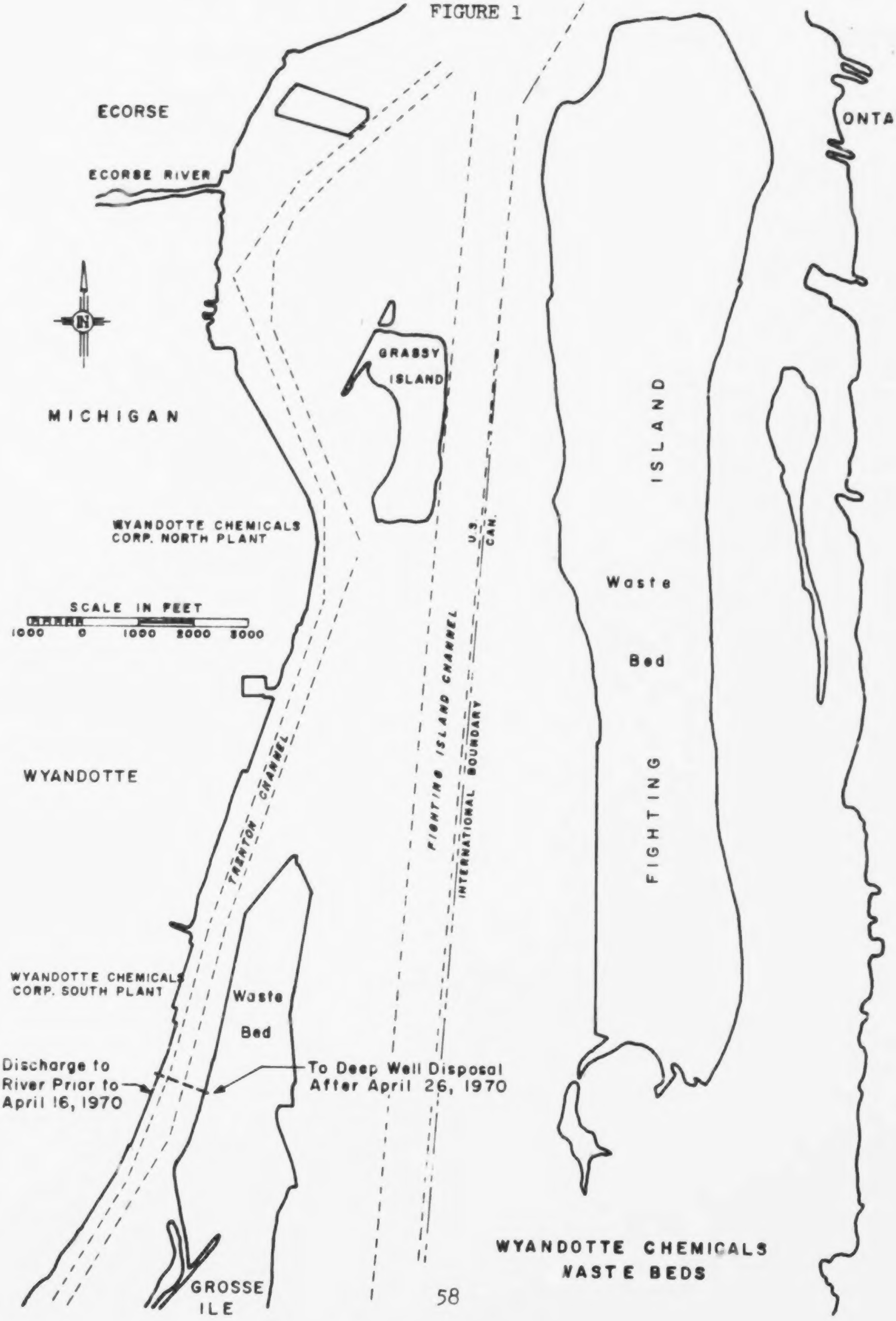
The pond took longer than anticipated to fill, indicating leakage. Seams in the concrete were then filled with asphalt compound and an area along the west wall was covered with a clay blanket. These measures apparently stopped the leakage problem. The company representative informed us that under drains from the pond connect to the discharge flume at W23 and the leaks were in the settling pond area so that even if leakage occurred, it would be treated effluent and would be measured at the same point as the effluent from the pond.

Composite samples collected and analyzed by Wyandotte Chemicals on three shifts at a point approximately 20 feet upstream in the waste flume from the point sampled by FWQA at the point of discharge to the river are as follows. Comparison with FWQA sampling for the same day is shown.

		Mg/l as Hg			Approx. lbs/day
April 15	Wyandotte Chemicals Composite	.027	.014	.012	1.8
		AM	PM		
	FWQA Grab Samples	.006	.026		1.8

777<

FIGURE 1


ECORSE
ECORSE RIVER
ONTARIO
N
GRASSY ISLAND
MICHIGAN
ISLAND
WYANDOTTE CHEMICALS CORP. NORTH PLANT
U.S.
CAN.
Waste
Bed
SCALE IN FEET
1000 0 1000 2000 3000
FIGHTING ISLAND CHANNEL
INTERNATIONAL BOUNDARY
WYANDOTTE
TRENTON CHANNEL
FIGHTING
WYANDOTTE CHEMICALS CORP. SOUTH PLANT
Waste
Bed
Discharge to River Prior to April 16, 1970
To Deep Well Disposal After April 26, 1970
GROSSE ILE

WYANDOTTE CHEMICALS WASTE BEDS

778<

FIGURE 1A

LAKE HURON BASIN OFFICE

SKETCH OF
WYANDOTTE CHEMICALS
TEMPORARY MERCURY TREATMENT

APRIL 16, 1970
No Scale

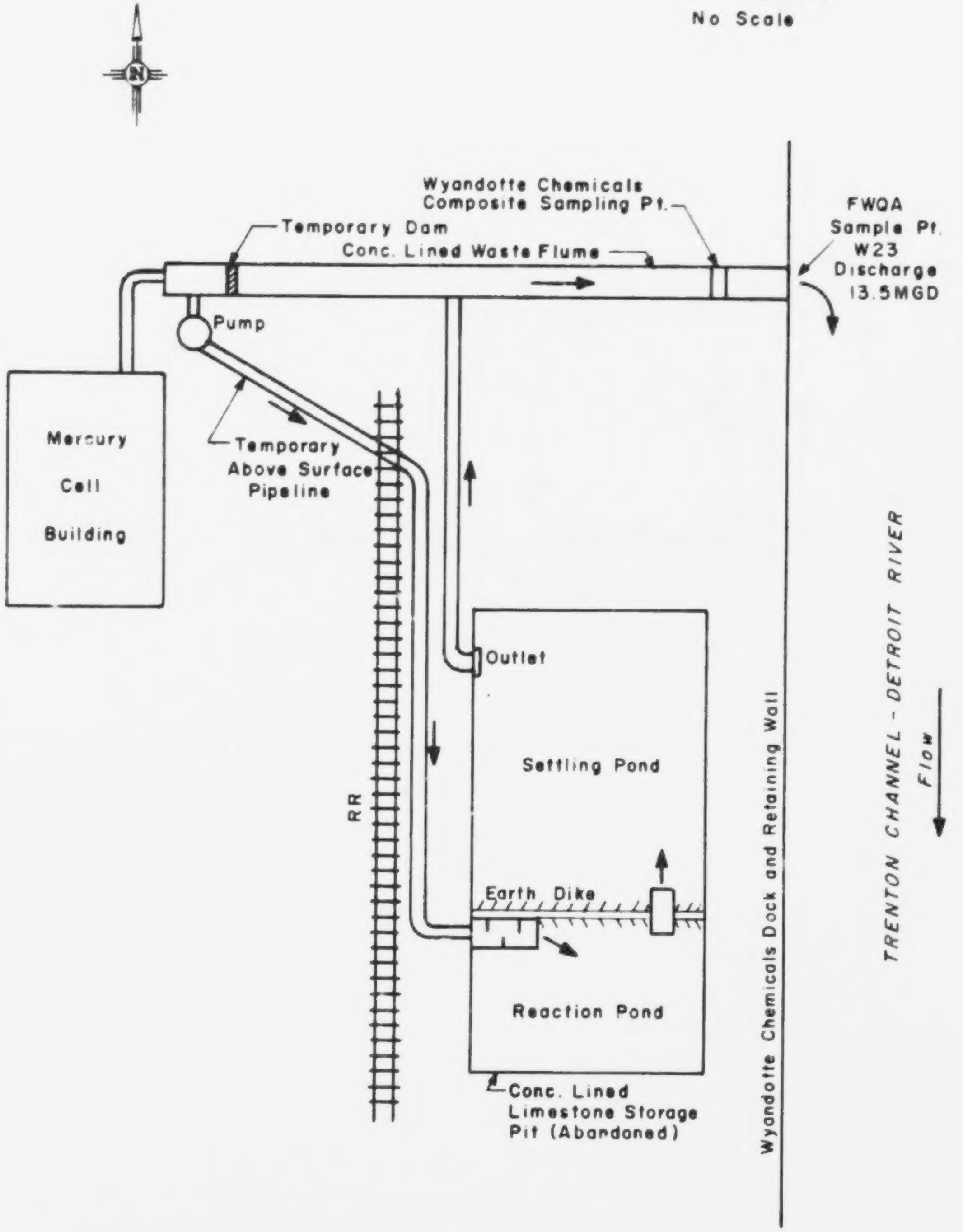

N
Wyandotte Chemicals
Composite Sampling Pt.
Temporary Dam
Conc. Lined Waste Flume
FWQA
Sample Pt.
W23
Discharge
13.5MGD
Pump
Mercury
Cell
Building
Temporary
Above Surface
Pipeline
Outlet
Settling Pond
RR
Earth Dike
Reaction Pond
Conc. Lined
Limestone Storage
Pit (Abandoned)
Wyandotte Chemicals Dock and Retaining Wall
TRENTON CHANNEL - DETROIT RIVER
Flow

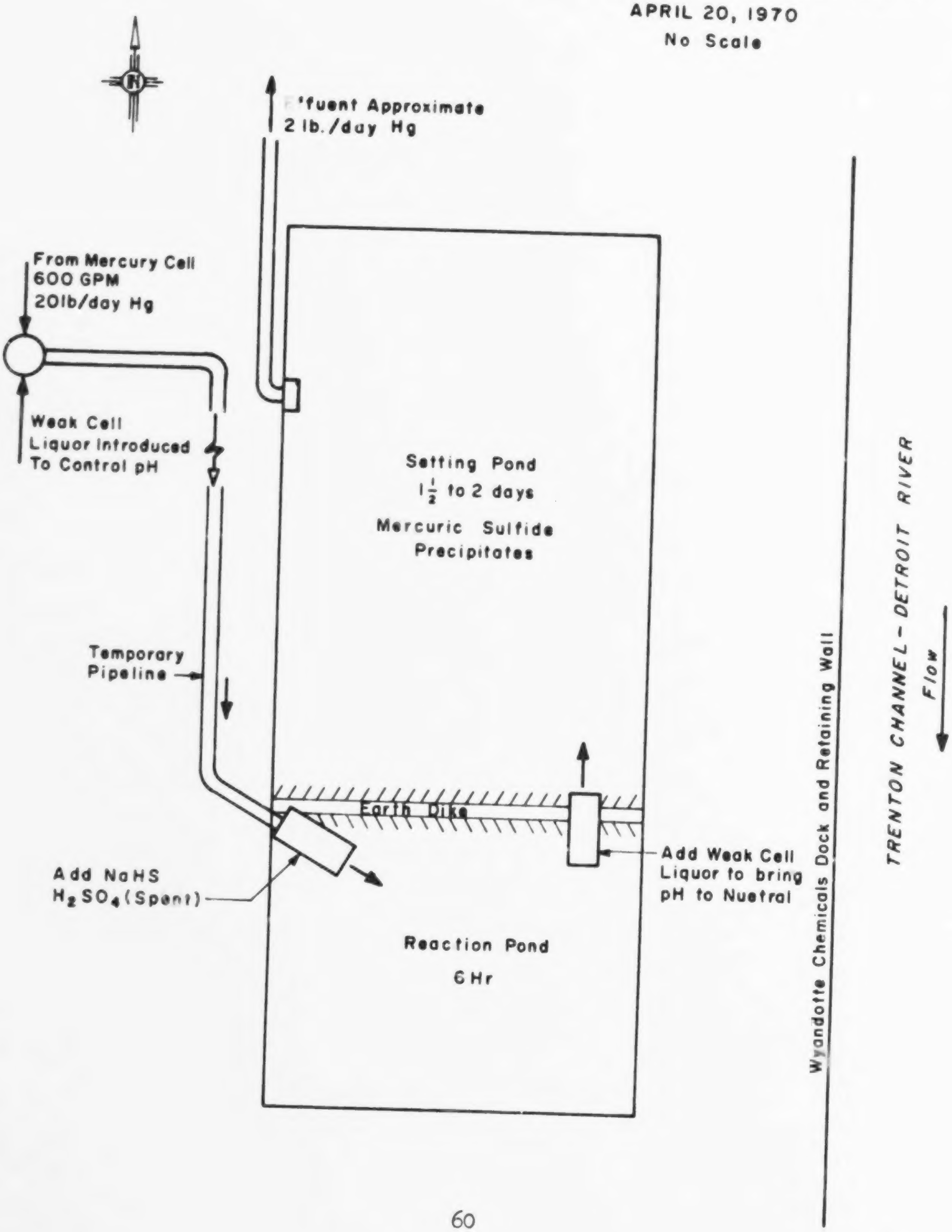
FIGURE 2

779<

LAKE HURON BASIN OFFICE

SKETCH OF
WYANDOTTE CHEMICALS
TEMPORARY MERCURY TREATMENT

APRIL 20, 1970
No Scale


N
Effuent Approximate
2 lb./day Hg
From Mercury Cell
600 GPM
20lb/day Hg
Weak Cell
Liquor Introduced
To Control pH
Setting Pond
1 1/2 to 2 days
Mercuric Sulfide
Precipitates
Temporary
Pipeline
Earth Dike
Add NaHS
H2SO4 (Spent)
Add Weak Cell
Liquor to bring
pH to Nuetral
Reaction Pond
6 Hr
Wyandotte Chemicals Dock and Retaining Wall
TRENTON CHANNEL - DETROIT RIVER
Flow

APPENDIX II

REPORT ON DETREX CHEMICAL CORPORATION, ASHTABULA, OHIO

PRELIMINARY REPORT ON MERCURY INVESTIGATIONS AT DETREX CHEMICAL CORPORATION, ASHTABULA, OHIO

180

April 29, 1970

DETREX PROCESS OPERATIONS

Detrex employs the mercury cell in the production of caustic soda (NaOH) and chlorine. In this process brine is decomposed in an electrolysis cell which utilizes mercury as the cathode and graphite as the anode. Chlorine collects at the anode and is led with slight vacuum to the outlet end (upper portion) of the cell. Sodium immediately forms an amalgam with the mercury, the mercury being placed in a thin layer at the bottom of the cell.

The basic reactions involved are:

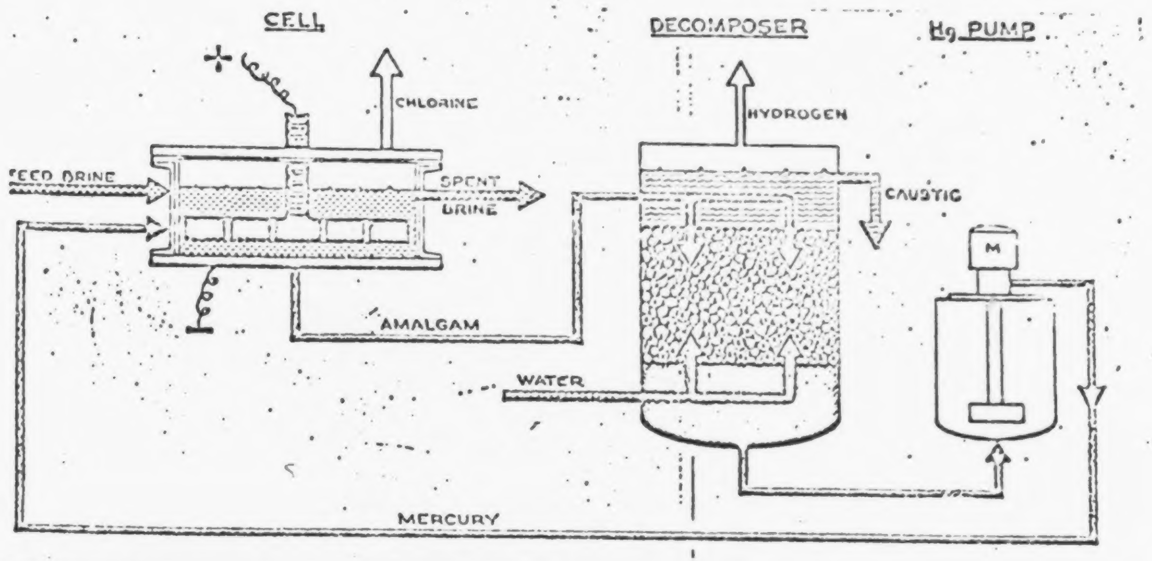
$2\ NaCl \rightarrow 2\ Na^+ + 2\ Cl^-$
$2\ Cl^- \rightarrow Cl_2 + 2e$ (at graphite anode)

$2\ Na^+ + 2e \rightarrow 2\ Na$ (at mercury cathode)

Through an opening at the bottom of the electrolysis cell, the sodium amalgam is directed to a scrubber-like tower (decomposer) where decomposition of the sodium amalgam takes place. The amalgam is introduced from above, through a series of graphite packings. Water is introduced from below and rises counter-current to the amalgam. The amalgam decomposition is affected by the formation of a large number of short circuited cells in which the amalgam and graphite are electrodes and the generated caustic solution is the electrolyte. The reaction which takes place is:

$$2\ Na\ (amalgam) + 2\ H_2O \rightarrow 2\ NaOH + H_2\uparrow$$

The mercury which is released from the amalgam collects at the bottom of the decomposer where it is withdrawn by a mercury pump and returned to the electrolysis cell. Hydrogen gas, along with traces of mercury vapor, is drawn off through a vent at the top of the decomposer and the caustic solution flows through an exit on the side near the top, as shown in the diagram. Some trace mercury contaminated hydrogen is sold to Linde Welding. The remainder is vented to the atmosphere through steam. Steam minimizes the possibility of fire and explosion.


CELL
DECOMPOSER
Hg PUMP
CHLORINE
HYDROGEN
FEED BRINE
SPENT BRINE
CAUSTIC
M
AMALGAM
WATER
MERCURY

SCHEMATIC DIAGRAM OF A MERCURY CELL

from Blaw-Knox Company -
"The Olin Mathieson Mercury Cell Process"
1963 Form No. 2723 3M

MERCURY LOSSES

According to Detrex at the time of the present investigation (1) there had been no change in recent weeks in the amount of mercury lost in the Chlor-Alkali process, (2) the present loss rate is representative of mercury losses since 1963, and (3) mercury analyses of the discharge effluent have, in the past, been made approximately once per month.

Detrex mercury purchases for electrolysis cell make-up, according to the plant manager, amount to 8-10 flasks per month. One flask of mercury is equivalent to 76 lbs. of mercury (mercury is 13.5 times as heavy as water). Detrex claims that all the 760 lbs. of monthly make-up mercury does not find its way to receiving waters - they claim some of it is pilfered because of its high market value (Retail $23 per lb. - Detrex $7 per lb.).

Since March 4, 1970 Detrex has been making frequent analyses for mercury in its waste discharge, sampling at the mouth of a multiple industry used waste water drainage ditch (station No. 4, attached map). Beginning April 17, the Lake Erie Basin Office has sampled daily several sites in the Detrex vicinity including station No. 4, a station (No. 2) in the ditch just below Detrex containing only that company's discharges, and a station (No. 1) at the Detrex sump effluent. The sump effluent is probably the source of most if not all present mercury discharge. Table 1 lists all the mercury analyses to date of samples from the above three stations.

782<

TABLE 1

MERCURY ANALYSIS OF DETREX EFFLUENT AND RECEIVING WATERS

Date	Sta. No. 4 Ditch mouth mg/l	Sta. No. 4 Ditch mouth lbs/day**	Sta. No. 2 Ditch below Detrex mg/l	Sta. No. 2 Ditch below Detrex lbs/day***	Sta. No. 1 Sump effluent mg/l	Sta. No. 1 Sump effluent lbs/day****
3-4-70	0.02	3.9				
3-13-70	0.02	3.9				
3-18-70	0.34	[illegible]				
3-25-70	<0.02	<3.9				
4-3-70	0.07	13.5				
4-6-70	0.11	21.4				
4-7-70	[illegible]	[illegible]				
4-8-70	0.01*	1.9				
4-9-70	0.29*	56.4				
4-10-70	0.01*	1.9	0.13	3.5		
4-17-70	0.009	<1.7	0.340	9.5	0.072	1.1
4-18-70	<0.005	<1.0	0.040	1.1	0.020	0.3
4-19-70	0.012	2.3	0.135	3.8	0.108	1.7
4-20-70	0.005	1.0	0.058	1.6	0.092	1.4
4-21-70	0.013	2.5	0.059	1.6	0.046	0.7
4-22-70	0.005	1.0	0.035	1.0	0.049	0.8
4-23-70	0.007	1.4	0.045	1.3	0.066	1.0
4-24-70	0.006	1.1	0.030	0.8	0.021	0.3
5-6-70	0.002	0.4			0.044	0.7

Underlined analyses by Detrex; all others by LEBO

* Data obtained from Detrex on 4-17-40; data reported earlier by Detrex did not include 4-9-70 analyses and showed <0.01 mg/l for 4-8-and 4-10-70.

** Loadings based upon 23.3 mgd ditch flow which includes flow from Detrex, Linde Welding, and Linde Air.

*** Loadings based upon 3.34 mgd from Detrex only.

**** Loadings based upon 1.87 mgd from Detrex sump effluent only (56% of Detrex total flow)

783<

TABLE 1 (Cont'd)

MERCURY ANALYSES OF DETREX EFFLUENT AND RECEIVING WATERS

Date	Sta. No. 4 Ditch mouth mg/1	 lbs/day**	Sta. No. 2 Ditch below Detrex mg/1	 lbs/day***	Sta. No. 1 Sump effluent mg/1	 lbs/day***
5/11/70	0.006	1.2			0.029	0.5

Underlined analyses by Detrex; all others by LEBO

* Data obtained from Detrex on 4-17-40; data reported earlier by Detrex did not include 4-9-70 analyses and showed <0.01 mg/1 for 4-8-and 4-10-70.

** Loadings based upon 23.3 mgd ditch flow which includes flow from Detrex, Linde Welding, and Linde Air.

*** Loadings based upon 3.34 mgd from Detrex only.

**** Loadings based upon 1.87 mgd from Detrex sump effluent only (56% of Detrex total flow)

Data collected by the Lake Erie Basin Office on April 10 and later (Table I) indicate that discharges to the lake have, in fact, been significantly reduced. Loadings which had previously ranged up to 66 lbs/day have been reduced to less than 2 lbs. per day. However, simultaneous data from the ditch at station No. 2 and at the sump effluent (station No. 1) indicate that mercury still continues to be discharged by Detrex. The data from station No. 2, which one would expect to show intermediate values between those of the sump effluent and the ditch mouth, were in most cases the highest. The anomaly is tentatively explained as being the result of the sampling technique which most likely included some of the "fluffy" sediment from the very shallow ditch waters. The comparatively low concentrations and loadings in the ditch mouth waters indicate that much of the mercury has been settling out in the ditch between Detrex and the lake. Sediment analyses at station No. 2 (see Table 2) show that the ditch sediments do contain significant amounts of mercury.

All mercury in water discharged from the ditch, according to the Ohio Department of Health, is attributable to Detrex since Linde Air and Linde Welding do not use or store mercury on the premises. Analyses of Linde Air and Linde Welding effluents, as listed in Table 2, support that assumption.

Three plants discharge to the waste drainage ditch. The names of those plants and their average flows, according to the Ohio Department of Health, are as follows:

Detrex	3.34	mgd
Linde Air	15.84	"
Linde Welding	4.14	"
Total	23.32	"

On a yearly average, according to the Detrex plant manager, the plant uses 2,750 gallons of water per minute or 3.96 mgd, somewhat higher than the above listed figure. As a result of in-process changes to April 21, 1970, also according to the plant manager, approximately 44% of the total Detrex flow or 1,200 gpm (1.73 mgd) has been removed from the sump, since it is mercury free.

Beginning April 8, 1970, Detrex made a change in discharge practices which it claims is responsible for the low effluent mercury concentrations beginning April 8, 1970. Prior to this time, all Detrex waste waters, including cooling waters, were discharged to the sump preceding the ditch that flows to the lake. The discharge change, claimed by Detrex to have been motivated by economic considerations, involved the removal of some cooling waters from the sump by bypassing the cooling waters through over-sump pipes directly to the ditch. With removal of the cooling waters from the sump, the detention time of the remaining waste discharged to the sump is increased. As a result larger quantities of suspended mercury compounds become settleable and should be removed in the sump.

STATE AND FEDERAL ACTIONS

On April 10, 1970, after the Ohio Health Department had determined that Detrex Chemical Corp. was a probable source of mercury discharge, a visit was made to the plant by Robert Swain, Ohio Department of Health, and Chris Potos, FWQA Lake Erie Basin Office. They met with Robert Baker, (plant manager), Robert Jones, John Kehm, and Dennis Ahistrom of Detrex Corporation. The purposes of this meeting were to learn specifics of the Detrex operation and to determine mercury loss rates, recent changes in the loss rates, and amounts discharged to waters of the state. At that time Detrex had already begun changing its operations to divert "clean" water from its mercury-containing waste flow.

On April 13, 1970 the Ohio Water Pollution Control Board issued a "cease and desist" order to the Detrex Corporation. It contained no time limit for compliance. A copy of this order and the reply to it are attached. The Detrex reply, dated April 17, claimed no mercury discharge to the waters of the state.

On April 17, 1970 Chris Potos and A. R. Winklhofer, FWQA Lake Erie Basin Office, met at Detrex with Messrs. Robert Emmet, Detrex Vice President and Robert Baker, plant manager, and with Mr. Robert Swain of the Ohio Department of Health to determine steps taken by Detrex to eliminate mercury discharges to waters of the State as demanded in the State's Cease and Desist order of April 13, 1970.

According to the plant manager steps taken by Detrex as of April 17 were as follows:

1. Floor washing stopped and all mercury picked up with vacuum cleaner since April 16, 1970.
2. Cell cleaning discontinued April 16, 1970 and no cells have been opened or cleaned since that time.

   Reference to 1. and 2. above--

   Detrex is installing a collecting tank and pump to collect floor water, cell spent brine, cell wash water, and return it to the brine system, at which time cell cleaning will be resumed.
3. Mercury treating has been stopped completely and indefinitely.

4. The following indirect cooling water streams are bypassing the sump:

    (1) Hydrogen gas cooler - approximately 65 gpm
    (2) Nash pump seal water cooler - approximately 100 gpm
    (3) Brine heat exchanger - 600 gpm

5. Detrex is filtering 50% caustic soda for the scrubber system (hypochlorite)

Detrex is actively engaged in engineering the following changes to:

1. Reroute the brine dechlorination condenser water to bypass the sump - approximately 500 gpm.

2. Provide a sump or catch basin for hydrogen seal pot water, nash pump seal water, etc., which can then be returned to the decomposer feed water.

3. Provide tank, pump piping, etc. to use filtered caustic for neutralizing waste sulfuric acid and chlorine water.

4. Construct a weir in the effluent ditch to measure quantity of flow; can be used also as a sample point.

5. Install caustic filter backwash tank.

Detrex was urgently advised by Mr. Potos on April 17:

1. to cease and desist mercury discharges to Lake Erie immediately

2. that the ditch and the multiple industry-used-settling pond were not to serve as treatment devices for mercury removal. Detrex discharges were to be made free of mercury prior to leaving Detrex property

3. to hire a consulting engineer to build a waste treatment system to permanently free Detrex discharge waters of mercury

4. to keep FWQA and ODH intimately informed through progress reports

On April 21, 1970, Mr. Potos again visited Detrex along with NFIC (FWQA) representatives, Messrs. John Hyland and Laurence Muir, and the Ohio Health Department's Earl Richards, James Shay, and Robert Swain, to further discuss the mercury problem and additional actions to hasten its abatement.

On a yearly average, according to the plant manager, Detrex uses 2,750 gallons of water per minute, with maximum water use occurring in summer. Based on in-process changes to April 21, 1970, approximately 44 percent of Detrex waste water (1,200 gal/min) has been determined by Detrex to be mercury free, and as a result removed from the sump. It is a Detrex objective as of April 21 to recycle waste streams that contain mercury back to the process in an enclosed system if at all possible. Optimum process operations with least possible mercury discharge are expected by Detrex in two to three weeks. If the mercury-laden streams are impossible to recycle, according to Detrex, the sump effluent will be treated as soon as a practical and economically feasible means becomes available. According to Detrex, the best brains in the chlor-alkali industry are working on the problem in a crash-program effort. If this effort does not meet with success, Detrex has agreed to our demand to hire consulting chemists and engineers to solve the problem. Presently this route is not favored by chlor-alkali people since they feel they know more about mercury (production, use, treatment) than any practicing consulting chemist or engineer. The State of Ohio is in complete agreement with Detrex thinking in this respect. Mr. Potos mentioned to them that ion exchange and reverse osmosis are now on a practical state of the art basis.

In an attempt to minimize the effect of expected seasonal increases in precipitation and consequent runoff on ditch sediment resuspension and scouring, Potos suggested that Detrex dredge the ditch from the sump to the settling pond. Detrex exceeded this request by volunteering to excavate a new ditch and complete fill in the old (see map).

During the weekend (April 18 and 19) the settling pond was being given its spring dredging by Linde Welding and the Union Carbide Corp. which owns the entire area and leases segments to various industries. The pond dredging does not seem to have affected mercury concentrations at the ditch mouth approximately one mile distant, at least not through April 20, 1970. Dredgings from the pond are purportedly trucked to State-approved land fill areas according to the Ohio Department of Health.

The Lake Erie Basin Office has sampled stations 1, 2, 3, 4, 5, 7, 8, 9, and 11 daily from April 17 through April 24. Station 11 is influent to the plant. Sampling will continue less frequently after April 24, 1970.

Table 2 lists other miscellaneous mercury sampling analyses in the vicinity of Detrex. At sampling station No. 9, east branch of the ditch, mercury presence is likely the result of back up water from Detrex as there are no known discharges of any kind to this branch.

The samples, both sediment and water, taken by the Lake Erie Basin Office are analyzed colorimetrically by that office using Dithizone with chloroform extraction.

Along with the attached map is a table of Lake Erie Basin Office analyses to date in the Detrex area. (Table 2).

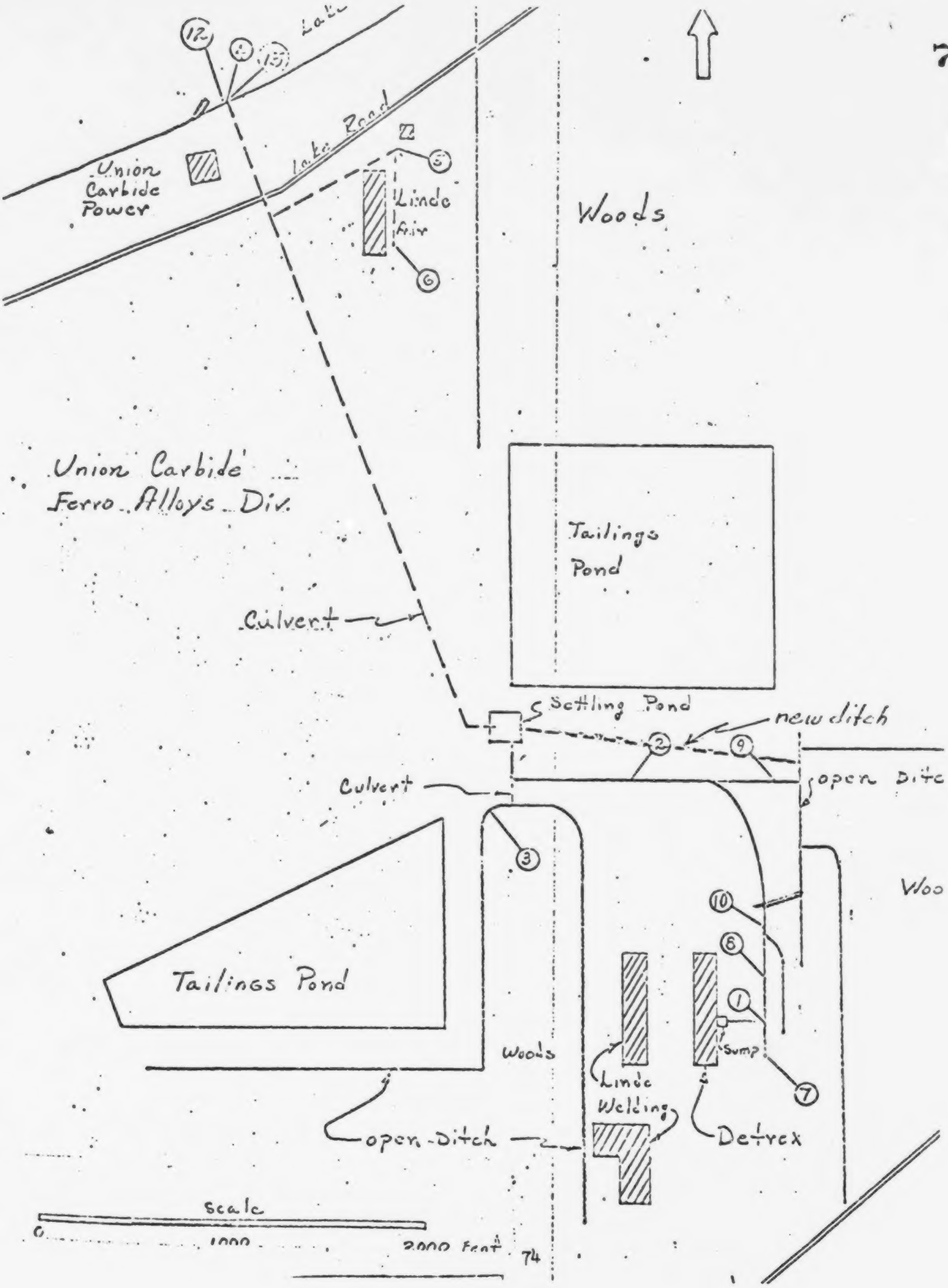
TABLE 2

DETREX AREA MISCELLANEOUS MERCURY ANALYSES

WATER (mg/1) AND SEDIMENT (mg/kg dry)

Sta. No.	Station	4/10	4/17	4/18	4/19*	4/20*	4/21	4/22	4/23	4/24
Water Sample										
3.	Linde Welding	-	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.10	<0.002
5.	Linde Air	-	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002
7.	Caustic Evaporator-Detrex	-	-	0.026	<0.002	0.020	<0.002	<0.002	0.002	0.038
8.	Heat exch-Condenser-Detrex	-	-	<0.002	<0.002	<0.002	<0.002	0.004	0.002	<0.002
9.	East branch ditch	-	-	<0.002	<0.002	0.020	0.058	<0.002	0.010	<0.002
11.	Detrex Influent	-	-	<0.002	<0.002	0.015	<0.002	<0.002	<0.002	<0.002
Sediment Sample										
2.	Ditch	-	49	169	-					
3.	Linde Welding	-	< 1	-	-					
9.	East branch ditch	-		13	-					
12.	20 feet North of ditch mouth					< 1				
13.	80 feet North of ditch mouth					< 1				

*4/19 precipitation 0.48 inches at Cleveland Weather Bureau
*4/20 precipitation 0.24 inches at Cleveland Weather Bureau


12
4
13
Lake
Lake Road
Union Carbide Power
5
Linde Air
6
Woods
Union Carbide Ferro Alloys Div.
Tailings Pond
Culvert
Settling Pond
new ditch
2
9
open Ditc
Culvert
3
Woo
10
8
1
Sump
7
Tailings Pond
Woods
Linde Welding
Detrex
open-Ditch
Scale
0
1000
2000 Feet

JAMES A. RHODES, Governor

EMMETT W. ARNOLD, M.D.
Director of Health

450 East Town Street
P.O. Box 118
Columbus, Ohio 43216

State of Ohio

Department of Health

PUBLIC HEALTH COUNCIL
Richard V. Brunner, D.D.S.
Chairman
J. Howard Holmes, M.D.
Vice Chairman
Ralph K. Ramsayer, M.D.
J. F. Meat, Ph.G.
Phillip T. Knies, M.D.
Lloyd E. Larrick, M.D.
J. Bruce Wenger, D.V.M.

790<

April 13, 1970

Detrex Chemicals Industries, Inc.
Chlorine-Alkali Plant
P.O. Box 670
Ashtabula, Ohio 44004

Attention: R. L. Baker, Plant Mgr.

Gentlemen:

You are hereby ordered to cease and desist the discharge of liquid industrial waste containing any mecurial compounds to waters of the state.

Any concentrations of mercury in the raw water used in your plant will be taken into consideration in the compliance with the order.

Please advise this office as to your compliance with the above order.

Yours very truly,

E. W. Arnold, M.D.
Director of Health

CERTIFIED MAIL

RECEIVED
APR 15 1970
DETREX CHEMICAL
INDUSTRIES INC.
CHLORINE ALKALI
PLANT

DETREX CHEMICAL INDUSTRIES, INC.
Chlorine - Alkali Plant
P. O. BOX 670
ASHTABULA, OHIO

791<

April 17, 1970

State of Ohio
Department of Health
450 East Town Street
P.O. Box 118
Columbus, Ohio 43216

Attention: Dr. E. W. Arnold, Director of Health

Dear Sir:

We received, April 15, 1970, your order "to cease and desist the discharge of liquid industrial waste containing any mercurial compounds to waters of the state."

We had previously taken effluent water samples at our discharge into Lake Erie on April 9th and April 10, 1970. Further samples were taken on April 14th and again on April 16th. In addition, lake bottom samples east, north and west of the discharge were taken on April 15th.

Using analysis methods approved by the State of Ohio, we have obtained negative mercury results on each of the above samples.

In accordance with the above analytical results, we state that the Detrex Chemical Industries, Inc. Chlorine-Alkali Plant at Ashtabula, Ohio is not discharging mercurial compounds to waters of the state.

Very truly yours,

DETREX CHEMICAL INDUSTRIES, INC.

Robert L. Baker
Plant Manager

RLB/nkv

792<

APPENDIX III

Inventory of Industries Using Mercury in the Lake Erie

TABLE
INVENTORY OF INDUSTRIES USING MERCURY

MICHIGAN

Name of Industry Location	Mercury Consumption (Purchased)	Discharge to	Type of Plant	Remarks
W. R. Grace & Co. Veratex Division 18610 Fitzpatrick Detroit, Mich. 48228		Detroit STP	Distributor	Repackages mercury and sells to dentists.
G. A. Ingram Co. 4444 Woodward Ave. Detroit, Mich. 48201	80#/year	Detroit STP	Manufacturers of instruments for medical profession.	Sell glass vials and one-ounce capsules to doctors.
Madison Dental Supply Co. 15888 Wyoming Detroit, Mich. 48238	100#/year	Detroit STP	Distributors of dental supplies.	Repackage mercury and sell to dentists.
H. O. Trerice 1749 Lafayette Blvd. Detroit, Mich. 48216	1000#/year	Detroit STP	Pressure gages and equipment	
Wyandotte Chemical Wyandotte, Mich.	80 lbs/day 30,000 lbs/yr	Detroit River	Chlor-alkali plant mercury cell	See report Appendix I
Penwalt Corp. Wyandotte, Michigan		Trenton Channel Detroit River	Diaphram method Chlor-alkali plant	Do not use mercury in its operation.

1. Paper mills in Michigan were checked for the use of mercury. Two mills use mercury in surfacing compounds and lose about two pounds per year.

2. Spot checks of other waste discharges from Chrysler Corp., Monsanto, Penwalt Chemicals, Wyandotte Chemicals (other than outfall W23 at RM 13.3), and Consolidated Paper revealed no detectable mercury.

TABLE
INVENTORY OF INDUSTRIES USING MERCURY

MICHIGAN

Name of Industry Location	Mercury Consumption (Purchased)	Discharge to	Type of Plant	Remarks
C & M Pharmical, Inc. 1519 E. 8th & Mile Road Hazel Park, Mich. 48203				Management reports no mercury purchased for last 9 years.
Detroit Edison Co. 2000 Second Ave. Detroit, Mich.		Detroit River	Electrical Power Production	Mercury used for switches and gage.
Harry W. Dietert Co. 9330 Roselawn Ave. Detroit, Mich. 48204	50#/year	Detroit STP	Testing equipment and gages.	

NEW YORK

TABLE
INVENTORY OF INDUSTRIES USING MERCURY

796<

Name of Industry Location	Mercury Consumption (Purchased)	Discharge to	Type of Plant	Remarks
Allied Chemical Co. Buffalo Dye Division Buffalo, New York	1560 lb/yr	Buffalo River	Dye plant - disulfonation of anthraquinone to produce disulfo intermediates 1:5 and 1:8.	Operate two processes on a batch basis. Would not reveal to FWQA when the process will be used. Are supposed to notify the New York State Health Department. A sample from the plant discharge on May 8, 1970, at an estimated flow of 4 mgd, had an average concentration of mercury of 0.12 mg/1. This is a discharge of 4 pounds of mercury per day.

TABLE
INVENTORY OF INDUSTRIES USING MERCURY

OHIO

Name of Industry Location	Mercury Consumption (Purchased)	Discharge to	Type of Plant	Remarks
Meriam Instrument Co. Div. of Scott & Fetzer Co. 10920 Madison Ave. Cleveland, Ohio			Instrument manufacture	No water contact with mercury.
The Schuemann-Jones Co. 3030 West 117th St. Cleveland, Ohio			Medical supplies	No water contact with mercury.
Standard Oil Co. of Ohio Midland Building Cleveland, Ohio 44115			Produces switches	No water contact with mercury
Bailey Meter Co. 29801 Euclid Ave. Wickliffe, Ohio 44092		Cleveland Easterly	Produces meters	Water contact in testing of meters. Loss is infinitesimal. 100 gal/day at 0.002 mg/1.
General Electric Co. 4 Plants			Mercury vapor lamps	No water contact with mercury.
1. Cuyahoga Lamp Plant Nela Park, Cleveland, Ohio			Research on fluorescent lamps	End cut from tubes are contaminated with mercury. Ends drop to water bath which is recirculated and has no water discharge.
2. Bucyrus, Ohio			Research on fluorescent lamps	Same process as at Nela Park--closed system.
3. Powder and Wire Plant Euclid, Ohio		Euclid, STP	Tungsten wire and powder	Mercury used in extrusion of wire--no water contact.
4. Chemical Products Plant		Cleveland Easterly STP	Reclaim mercury	Batch process. During discharge concentration was 0.3 mg/1--no volume of flow available. Plant will be resampled to determine concentration and volume.

797-a

TABLE
INVENTORY OF INDUSTRIES USING MERCURY

OHIO

Name of Industry Location	Mercury Consumption (Purchased)	Discharge to	Type of Plant	Remarks
Bellows Electric Sign Co. 861 E. Tallmadge Ave. Akron, Ohio 44309			Manufacture signs	No water contact with mercury.
Case Western Reserve Univ. Attn: G. J. Kibler, Mgr. of Purchasing Department 2220 Circle Drive Cleveland, Ohio 44106				
Lincoln Electric Co. 22801 St. Clair Ave. Cleveland, Ohio 44117		Euclid STP	Manufactures welding equipment	No water contact with mercury.
National Aeronautics & Space Administration Lewis Research Center 21000 Brookpark Road Cleveland, Ohio 44135		Rocky River	Research, U.S. Government	Hg. used in ion engine research. Mercury vapor is scrubbed and waste water goes to a lagoon that discharges to Rocky River. **Lagoons are usually discharged in the afternoon.** Sample of water into lagoons showed <0.002 mg/1 mercury. Outfall that receives storm and roof drains showed 0.011 mg/1 when no lagoon water was being discharged. Source is unknown.
Owens Illinois Glass Co. All Plants (4) Box 1035-1036 Toledo, Ohio 43601				Company contacted by State. Told State to return at later date. Suspected mercury discharger.

TABLE
INVENTORY OF INDUSTRIES USING MERCURY

OHIO

Name of Industry Location	Mercury Consumption (Purchased)	Discharge to	Type of Plant	Remarks
Reactive Metals, Inc. East 21st St. Ashtabula, Twp.			Manufacture titanium sponge	Possibility of mercury in vapor. Mercury found (42 mg/Kg) in sediment in stream receiving pot wash effluent. Not detectable in water. Source of mercury in sediment should be determined.
Detrex Industries Ashtabula, Ohio	9,120 lbs annually	Lake Erie	Mercury cell Chlor-alkali plant	Management reports Detrex has been purchasing 760 pounds of mercury per month since 1963 to make up for process losses. See Special Report Appendix II
Diamond Shamrock Corp. Electro Chemical Division Painesville, Ohio	Not reported	Grand River to Lake Erie	Diaphram method Chlor-alkali plant	Management reports plant is not using or planning to use mercury in its commercial process. Small amount of mercury used for instrumentation. Diaphram method for production of chlorine and caustic soda does not use mercury. A small amount was used about 2 years ago for 2 days in an experiment to produce chlorine and caustic soda.
Union Carbide Consumer Products Co. Division of Union Carbide P.O. Box 2837 Rocky River, Ohio 44116				No water contact with mercury.

TABLE
INVENTORY OF INDUSTRIES USING MERCURY

PENNSYLVANIA

Name of Industry Location	Mercury Consumption (Purchased)	Discharge to	Type of Plant	Remarks
American Meter Company 920 Payne Avenue P. O. Box 1251 Erie, Penna.				

APPENDIX IV

FISH ANALYSED FOR MERCURY CONTENT

BUREAU OF COMMERCIAL FISHERIES
TECHNOLOGICAL LABORATORY
ANN ARBOR, MICHIGAN

Bureau of Commercial Fisheries
Technological Laboratory
Ann Arbor, Michigan 48107
April 15, 1970

Fish Analyzed for Mercury Content: Report No. 1

Species	Part Analyzed	Code No.	Catch Location	Catch Date	No. fish in Composite	Length ave./range (inches)	Weight ave./range (lbs)	Mercury* Content (ppm, wet wt.)
Yellow perch	whole	-	Lake Erie (Wheatley, Ont.)	12/10/69	(500 lbs)	-	-	0.25
Yellow perch	whole	-	Lake Michigan (Mich City, Ind.)	10/28/69	(550 lbs)	-	-	0.18
Chub	whole	-	Lake Michigan (South Haven, Mich.)	10/28/69	(600 lbs)	-	-	0.10
Coho salmon	whole	-	Lake Michigan (Platte River)	11/69	(500 lbs)	-	-	0.30
Coho salmon	whole	-	Lake Eire (Erie, Penna.)	11/69	(600 lbs)	-	-	0.36
Carp	edible[1/]	EJG01	Lake Erie (Bono)	4/1/70	10 fish	24.5 22.9-26.8	8.92 6.46-12.76	0.28
White bass	edible	EPG02	Lake Erie (Bono)	3/30/70	15 fish	10.2 9.0-14.3	0.54 0.32-1.63	0.80
Yellow perch	edible	EEG02	Lake Eire (Bono)	3/30/70	13 fish	8.46 8.0-9.6	0.30 0.37-0.47	0.44
Walleye	edible	XNG01	Lake St. Clair (New Baltimore)	3/30/70	5 fish	14.1 12.0-17.6	1.11 0.60-2.11	1.4
Walleye	edible	XNG02	Lake St. Clair (Pigeon Island) Reach	3/28/70	11 fish	18.9 16.4-20.9	2.87 1.86-3.69	2.0

[1/] Headed and gutted, scaled, tail-off.

*Method of Analyses - Atomic Absorption

Bureau of Commercial Fisheries
Technological Laboratory
Ann Arbor, Michigan
April 22, 1970

Fish Analyzed for Mercury Content: Report No. 2

Species	Part Analyzed	Code No.	Catch Location	Catch Date	No. fish in Composite	Length Avo./range (inches)	Weight Ave./range (lbs.)	Mercury * Content (ppm,wet wt.)
Carp	Edible 1/	EJG02	L. Erie (Sandusky, O.)	3/30/70	15	21.5 17.0-25.8	6.25 2.82-10.49	0.08
Yellow Perch	"	EEG01	"	"	16	0.92 0.82-1.08	0.41 0.27-0.65	0.32
Coho Salmon	"	EFG01	"	"	14	17.1 14.7-18.9	1.85 1,04-2.51	0.24
White Bass	"	EPG01	"	"	15	11.7 9.1-13.8	0.83 0.51-1.46	0.80
Channel Catfish	"	EIG01	"	"	13	15.3 13.8-20.0	1.33 0.89-3.08	0.32
Sheepshead	"	EOG01	"	"	15	14.9 11.8-19.2	1.56 0.62-3.19	0.24
Gizzard Shad	"	EQG01	"	"	16	13.4 11.8-14.3	1.04 0.73-1.84	0.24
Sucker	"	XKG01	L. St. Clair (New Baltimore)	4/1/70	3	14.5 11.7-16.8	1.44 0.65-2.23	0.88
Northern Pike	"	XLG01	"	"	3	16.9 15.6-18.9	0.95 0.88-1.19	0.64
Yellow Perch	"	XEG01	"	"	18	9.72 8.19-12.09	0.45 0.21-0.99	1.10

1/ Headed and gutted, scaled, tail-off. *Method of Analyses - Atomic Absorption

Bureau of Commercial Fisheries
Technological Laboratory
Ann Arbor, Michigan 48107
April 14, 1970

Fish Analyzed for Mercury Content: Report No. 3 (Cont.)

Species	Part Analyzed	Code No.	Catch Location	Catch Date	No. fish in Composite	Length ave./range (inches)	Weight ave./range (lbs)	Mercury* Content (ppm, wet wt.)
N. pike	offal*	XLH01	Lake St. Clair (New Baltimore)	4/1/70	3	16.9 15.6-18.9	0.95 0.88-1.19	0.88
Walleye	offal*	XNH01	Lake St. Clair (New Baltimore)	3/30/70	5	14.1 12.0-17.6	1.11 0.60-2.11	0.80
Walleye	offal*	XNH02	Lake St. Clair (Peach Island)	3/28/70	11	18.9 16.4-20.9	2.87 1.86-3.69	1.40

Edible - Headed and gutted, scaled, tail-off.

Offal - All processing waste from "edible."

* - Denotes the corresponding offal sample for a previously reported edible sample. The third letter in the code No. represents the type of sample; G is "edible," H is "offal."

*Method of Analyses - Atomic Absorption

Bureau of Commercial Fisheries
Technological Laboratory
Ann Arbor, Michigan 48107
May 15, 1970

Fish Analyzed for Mercury Content: Report No. 4

Species	Part Analyzed	Code No.	Catch Location	Catch Date	No. fish in Composite	Length ave./range (inches)	Weight ave./range (lbs)	Mercury Content (ppm, wet wt.)	Method
Yellow Perch	Edible[1/]	EEG03	Lake Erie (Monroe)	4/6/70	10	8.35 7.7-9.13	0.29 0.22-0.41	1.7	AA (WARF)
Yellow Perch	Offal[2/]	EEH03	"	"	10	"	"	0.88	"
Coho Salmon	Edible	EFG02	Lake Erie (Bono)	3/30/70	12	17.4 16.1-19.1	1.97 1.55-2.52	0.96	"
Coho Salmon	Offal	EFH02	"	"	12	"	"	1.0	"
Coho Salmon	Edible	EFG03	Lake Erie (Monroe)	4/10/70	4	18.4 17.2-19.5	2.48 1.90-2.87	0.96	"
Coho Salmon	Offal	EFH03	"	"	4	"	"	1.2	"
Channel Catfish	Edible	EIG02	Lake Erie (Bono)	3/30/70	10	14.8 13.6-16.6	1.00 0.72-1.53	1.8	"
Channel Catfish	Edible	EIG03	Lake Erie (Monroe)	4/6/70	10	14.3 13.5-15.2	0.98 0.78-1.14	1.3	"
Carp	Offal[3/]	EJH01	Lake Erie (Bono)	4/1/70	10	24.5 22.9-26.8	8.92 6.46-12.76	0.44	"

[1/] Headed and gutted, scaled, tail-off.

[2/] All processing waste from "edible".

[3/] Denotes the corresponding offal sample for a previously reported edible sample.

The third letter in the code No. represents the type of sample; G is edible, H is offal.

Bureau of Commercial Fisheries
Technological Laboratory
Ann Arbor, Michigan 48107
May 15, 1970

Fish Analyzed for Mercury Content: Report No. 4 (Cont.)

Species	Part Analyzed	Code No.	Catch Location	Catch Date	No. fish in Composite	Length ave./range (inches)	Weight ave./range (lbs)	Mercury Content (ppm, wet wt.)	Method
Yellow Perch	Offal[3]	EEH01	Lake Erie (Sandusky)	3/30/70	16	9.2 8.2-10.8	0.41 0.27-0.66	0.36	AA (WARF)
Walleye	Edible	ENG04	Lake Erie (Monroe)	4/7/70	19	17.9 14.9-21.2	2.31 1.31-3.86	3.60	"
Steelhead	Edible	ERG01	Lake Erie (Monroe)	4/10/70	2	17.9 16.4-19.5	2.03 1.34-2.72	< 0.15	"
Walleye	Edible	ENG01	Lake Erie (Sandusky)	4/3/70	10	18.6 16.8-21.2	2.77 1.94-4.51	2.60[4] (2.40-2.80)	"
Walleye	Edible (Butterfly fillets)	E-1	Lake Erie (Raison Pt.) (Monroe)	4/30/70	3	Total sample - 2.58 lb.		3.57	AA (EHL)
White Bass	Edible (Single fillets)	E-2	"	4/30/70	10	Total sample - 2.71 lb.		0.53	"

1/ Headed and gutted, scaled, tail-off.

2/ All processing waste from "edible".

3/ Denotes the corresponding offal sample for a previously reported edible sample.
The third letter in the code No. represents the type of sample; G is edible, H is offal.

4/ Ave. of six individual determinations on blind, coded samples.

805<

APPENDIX V

STANDARDS FOR MERCURY AND HEAVY METALS
LAKE ST. CLAIR - LAKE ERIE DRAINAGE AREA

FEDERAL-STATE WATER QUALITY STANDARDS AND USPHS DRINKING WATER STANDARDS FOR MERCURY AND HEAVY METALS[1/] LAKE ERIE-LAKE ST. CLAIR DRAINAGE AREA

The National Technical Advisory Committee on Water Quality Criteria states: "Surface waters should be free of substances attributable to discharge or wastes as follows: materials, including radionuclides, in concentrations or combinations which are toxic or which produce undesirable physiological responses in human, fish and other animal life, and plants."

Specific numberical criteria for toxic substances have been included in water quality standards as follows:

State	Metal	Criteria Values in mg/l	Use Classification to Which Applied
Indiana	Cadmium	0.01	Water Supply
	Chromium (hexavalent)	0.05	Water Supply
	Lead	0.05	Water Supply
	Silver	0.05	Water Supply
	All Toxic Materials	0.1 96-hr TLm[2/]	Fish & Wildlife
Michigan	Chromium (hexavalent)	0.05	Water Supply
New York	No Specific Criteria		
Ohio	Cadmium	0.01	Water Supply
	Chromium (hexavalent)	0.05	Water Supply
	Lead	0.05	Water Supply
	Silver	0.05	Water Supply
	Iron (certain rivers on Ohio-Pa. border only)	1.5	Water Supply
	All Toxic Materials	0.1 48-hr TIm	Aquatic Life and Recreation
Pennsylvania	Manganese	1.0	All Uses
	Iron (Total)	1.5	All Uses
	Iron (Dissolved)	0.3	All Uses

[1/] Heavy metals considered: cadmium, chromium, copper, iron, lead, manganese, silver, and zinc.

[2/] The TIm is the concentration of a toxic material which produces death to one-half of the test organisms in a bioassay test within a specified length of time (e.g. 48 hours or 96 hours).

807<

APPENDIX VI

CHRONOLOGY OF EVENTS

CHRONOLOGY OF EVENTS

March 24, 1970

The Canadian Federal Department of Fish and Forestry banned the sale and export of fish caught commercially within the Canadian boundaries of Lake St. Clair because concentrations of mercury in some of the fish made them unfit for consumption. The decision was made as a result of a research report which showed pickerel caught in the lake contained as much as seven parts per million mercury (ppm). Subsequent laboratory reports indicated a somewhat lower figure of 1.36 ppm which, however, is still almost three times as great as 0.5 ppm level considered acceptable for fish procured for export by federal food and drug authorities in both Canada and the United States. The Ontario Water Resources Commission identified one Dow Chemical of Canada Limited chlor-alkali plant at Sarnia, Ontario as the source of mercury pollution to the St. Clair River.

FWQA Regional Office learned from Mr. Ralph Purdy, Executive Secretary, Michigan Water Resources Commission, that he had written letters to chlor-alkali plants in the state to find out who was using mercury cells. He reported that the Wyandotte Chemical Company on the Detroit River uses mercury cells and that he was conducting discussions with them to learn about the disposition of their mercury bearing wastes.

March 26, 1970

Coordination achieved with Michigan agencies, Ontario Water Resources Commission, Bureau of Commercial Fisheries, and Food and

807 b

Drug Administration. FWQA Lake Huron Basin Office initiates a water and sediment sampling program for the St. Clair River, Lake St. Clair, Detroit River, and Western Shore of Lake Erie. Advised that Field staffs of the Bureau of Commercial Fisheries, Great Lakes Fisheries Laboratory, Ann Arbor, and the Department of Natural Resources, would be conducting a fish sampling program and that arrangements were being made for the Wisconsin Alumni Research Foundation (WARF), Madison, Wisconsin to analyze the fish samples. Learned that the Michigan Health Department and the Michigan Water Resources Commission were getting samples from water intakes, treatment plants and industrial outfalls for analyses of mercury at the Lansing laboratory.

March 27, 1970

FWQA Lake Huron Basin Office begins collecting water and sediment samples from the Wyandotte Chemical plant.

April 2, 1970

Regional Director, GLR, chaired an informal meeting at FWQA Headquarters, Washington, D. C., with Bureau of Commercial Fisheries, Bureau of Sports Fisheries and Wildlife, Food and Drug Administration, and Ontario and Canadian Federal representatives. The meeting was called to obtain a better understanding of the mercury problem and to exchange information. It was the consensus of the representatives present that the mercury problem is serious and of international concern. It was also agreed that an inventory of mercury uses to determine waste concentration was needed and that sampling should continue in order that the problem may be completely defined.

April 8, 1970

Governor Milliken of Michigan advises sportsmen not to eat fish caught from Lake St. Clair and the Detroit and St. Clair Rivers.

April 10, 1970

A meeting of Ontario, Michigan, and Ohio representatives was held in Toronto, Ontario to share information and explain how decisions were reached for Ontario to place a ban on fishing in Lake St. Clair, St. Clair River, and Detroit River. Federal people from Canada and the United States were invited as observers. Mr. O'Leary of the Lake Huron Basin Office, represented the FWQA Great Lakes Region at the meeting.

Rperesentatives of all agencies agreed that sampling and testing must continue in order that the problem may be completely defined.

Mr. Kerr, Federal Energy and Resources Minister, described the action that has been taken to halt any further mercury discharge from the presently known source of pollution on the Canadian side of the boundary in this area, and Governor Milliken stated that he had received an assurance today that the presently known source on the Michigan side had today instituted procedures to eliminate future mercury contamination of the water from its facility.

It was agreed that future action will be taken in a coordinated way so that all involved agencies may take similar action.

The representatives of the States of Ohio and Michigan agree with those from Ontario that a ban on fishing in Lake Erie is not indicated at this time. Their respective agencies agreed to exchange information from their sampling and testing programs.

Governor Milliken announced the following actions and agreements:

1. Michigan will institute proceedings to close Lake St. Clair and the St. Clair River to all fishing as a precautionary measure pending further study;

2. Michigan, Ontario, Ohio FDA and the U. S. Federal Water Quality Administration agreed to cooperate in developing further information on the Detroit River and Lake Erie;

3. Participants in the meeting agreed to continue and accelerate efforts to eliminate mercury contamination from all sources;

4. All parties agreed to consult with various other authorities prior to taking actions affecting waters of the Great Lakes;

5. All parties agreed to participate, with other authorities, in investigating additional dangerous substances as to kinds, amounts and effects;

6. All parties agreed to recommend the convening of a conference of the Governors and Prime Ministers of the Great Lakes States and Provinces;

7. All parties agreed to urge all respective federal bodies to initiate actions to investigate sources of mercury contamination in all states and provinces.

Ohio Department of Health determines Detrex Chemical Company of Ashtabula, Ohio a probable source of mercury contamination.

FWQA Lake Erie Basin Office, Cleveland initiates a water sampling program in Lake Erie and tributaries and participates in an inspection of the Detrex Chemical Company plant.

Wyandotte Chemical plant ceased mercury waste discharges to the Detroit River at 12:30 p.m. Mercury enriched waters are now being discharged in holding facilities for chemical treatment.

April 13, 1970

Governor Rhodes of Ohio announced a ban on commercial fishing in Lake Erie.

Ohio Water Pollution Control Board issued a "cease and desist" order to Detrex Chemicals Company.

FWQA Lake Huron Basin Office personnel met with Michigan State officials. The MWRC agreed to supply one man to aid in the field work collecting sediment samples and to share duplicate samples for verification purposes. MWRC to continue sampling effluents in the area.

April 14, 1970

FWQA Great Lakes Region Basin Offices provided with a list of chlor-alkali plants and asked to investigate as sources of possible mercury pollution.

April 16, 1970

The Wyandotte Chemical Company was issued a court order to cease discharges of mercury wastes in any form or amount. The plant ceased operation of the mercury cell room at 6:20 p.m.

April 21, 1970

Secretary of the Interior Walter J. Hickel announced his Department is initiating a massive campaign to clean up Lake Erie, as a result of reports of lethal discharges of mercury into the Lake and into the Detroit River which empties into Lake Erie.

In a series of steps, Secretary Hickel announced taking the following action:

— An enforcement conference on Lake Erie will be reconvened in Detroit, followed by enforcement workshops in Toledo, Cleveland, Lorain, Sandusky, and Ashtabula, Ohio; Erie, Pennsylvania; and Lackawanna, New York.

— The Secretary's special investigative task force has been assigned to obtain firsthand up-to-date data on the entire water pollution problem in the Lake Erie watershed.

— Increased monitoring and research will be initiated at the Fish and Wildlife Service's Great Lakes Fishery Laboratory at Ann Arbor, Michigan, on the toxicity of mercury and other metal compounds and their effect on fish and other aquatic life.

— The Federal Water Quality Administration has been directed to identify and prepare a list of all toxic substances now being discharged in waters throughout the United States.

April 23, 1970

Assistant Secretary for Water Quality and Research, Carl Klein, directed the Commissioner, FWQA, to take necessary immediate action to translate the Secretary of the Interior's announcements of April 21 into positive action. He also asked that the Task Force assigned to obtain firsthand up-to-date data on the entire water pollution problem in Lake Erie and coordinate with Michigan, New York, Ohio and Pennsylvania.

April 29, 1970

Prime Minister John P. Roberts of Ontario called a conference for June to discuss pollution problems in Lake Erie. The Prime Minister invited the Prime Minister of Quebec and the Governors of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin.

April 30, 1970

Governor Rockefeller of New York announced that the Department of Agriculture and Markets began placing all fish caught commercially in Lake Erie under seizure to protect consumers from mercury contamination. The Department of Conservation advised sports fishermen against eating fish taken from Lake Erie. This action was taken after analysis of several New York fish samples showed levels of mercury in excess of 0.5 ppm considered acceptable for sale by the Food and Drug Administration. The Governor announced that the State Health Department also had tested drinking water taken from Lake Erie and that it had been found fully safe for human consumption.

Staff members of the FWQA Great Lakes Region met with members of the Secretary of the Interior's Task Force to develop plans for action required to implement the Secretary's announcement of April 21. Recommendations for appropriate field investigations and research projects were developed for Headquarters' consideration.

May 1, 1970

The State of Ohio rejected 11,300 lbs. of fish caught in Ohio waters of Lake Erie because of high levels of mercury (greater than 0.5 ppm.) The rejected fish were from 8 commercial catches of 5 fisheries and were primarily white bass, sheephead and catfish caught in the western basin and the western end of the easterly basin of Lake Erie. The samples analyzed consisted of 400 fish and contained mercury ranging from 0.51 to 0.64 ppm. The State of Ohio made the analysis.

May 4, 1970

Governor Warren Knowles of Wisconsin issued a 30-day emergency order closing 35 miles of the Wisconsin River for fishing due to mercury contamination. The Wisconsin Department of Natural Resources issued a cease and desist order to Wyandotte Chemical Corporation of Port Edwards to halt the discharge of mercury laden wastes into the Wisconsin River.

The Assistant Commissioner for Enforcement FWQA was requested by the Commissioner, Erie County Department of Health to conduct an extensive water and bottom sampling program for toxic materials and substances not only in the western basin but throughout Lake Erie. The Commissioner also requested a re-evaluation of the 1967 compliance schedule to determine whether any of the municipalities and industries not in compliance are contributing toxic discharges.

May 5, 1970

A representative from the Ohio Department of Health visited Reactive Metals Inc., Metal Reduction Plant in Ashtabula, Ohio to obtain information pertaining to mercury discharges. Samples from the plant effluent and receiving tributary were collected for analyses.

May 6, 1970

Representatives from the Ohio Department of Health, and FWQA, Lake Erie Basin Office, either visited or contacted by telephone the following industries to obtain information regarding mercury usage:

Bailey Metal Co., Wickliffe, Ohio

General Electric Co., Cuyahoga Plant, Cleveland, Ohio

General Electric Co., Large Lamp Engineering and Pilot Plant, Cleveland, Ohio

Standard Oil Co. of Ohio, Cleveland, Ohio

The FWQA, Lake Erie Basin Office collected sediments samples from the Buffalo River for mercury analyses.

An effluent sample from the Cleveland Easterly Sewage Treatment Plant was obtained for mercury analysis by Lake Erie Basin Office.

May 7, 1970

Representatives from the Ohio Department of Health, and the FWQA Lake Erie Basin Office visited the following industries to obtain information pertaining to mercury usage:

National Aeronautics & Space Administration, Lewis Research Center, Cleveland, Ohio

Lincoln Electric Co., Cleveland, Ohio

General Electric Co., Powder & Wire Plant, Euclid, Ohio

General Electric Chemical Products Plant, Cleveland, Ohio

May 8, 1970

Regional Director, FWQA Great Lakes Region presented testimony on mercury contamination in the Great Lakes to the Subcommittee on Energy, Natural Resources and Environment of the Senate Commerce Committee at Mount Clemens, Michigan.

Secretary of the Interior announced that the fifth session of the Lake Erie Enforcement Conference would be held on June 3, 1970 at Cobo Hall in Detroit, Michigan.

Representatives from the Ohio Department of Health and the FWQA Lake Erie Basin Office either visited or contacted by telephone the following industries to obtain information pertaining to mercury usage:

Union Carbide Corp., Electronic Components Div., Cleveland, Ohio
Union Carbide Corp., Carbon Products Plant, Cleveland, Ohio
Union Carbide Corp., Edgewater Works, Cleveland, Ohio
I. Miller Inc., Cleveland, Ohio
Merian Instrument Co., Cleveland, Ohio
Schuemann-Jones Co., Cleveland, Ohio
B. F. Goodrich, Avon Lake, Ohio
E. I. DuPont de Nemours Co., Cleveland, Ohio

Representatives from the New York State Health Department and FWQA, Lake Erie Basin Office visited the Allied Chemical Co., Buffalo, New York Dye Division, to obtain information on mercury usage. The New York State Health Department requested the Allied Chemical Co. to minimize the discharge of mercury and to report immediately of their steps for compliance.

May 9, 1970

Allied Chemical Corporation of Syracuse, New York diverted their mercury bearing wastes to their settling ponds. Previously wastes were discharged to streams flowing into Onadaga Lake. The settling ponds being used for mercury wastes may still, however, overflow into streams flowing into Onadaga Lake.

May 11, 1970

A representative from the Ohio Department of Health contacted by telephone the following industries to obtain information pertaining to mercury usage:

Harshaw Chemical Co., Cleveland, Ohio
Bellows Electric Co., Akron, Ohio

Effluent samples from Detrex Chemical Co., Euclid Sewage Treatment Plant, and Cleveland Westerly and Southerly Sewage Treatment Plant were obtained for mercury analyses by FWQA Lake Erie Basin Office.

The Director, Lake Erie Basin Office notified the Regional Director, Great Lakes Region, that the Allied Chemical Co., Buffalo, New York is a source of mercury in the Lake Erie Basin. He recommended that New York State Health Department issue a desist order.

Wayne C. Bellaman, Regional Sanitary Engineer for the Pennsylvania Department of Health, announced the following:

1. Declared that concentrations of mercury in the waters of Lake Erie used for municipal and industrial water supply by the City of Eire are within the limits safe for domestic and industrial use and consumption. No concentrations of mercury in excess of 0.005 mg/l were found in samples of raw water collected from both of the City water works.

2. Selected municipal and industrial waste discharges were sampled, including the effluent from the City of Erie Sewage Treatment Plant and the Hammermill Paper Co. No concentrations of mercury have been confirmed in these discharges in excess of those from the waters withdrawn by the City of Erie and the Hammermill Paper Co. from Lake Erie.

3. The Erie County Health Department has been assisting in this investigation by checking hospitals and industries connected to the Erie sewer system. No potential major sources of mercury are known to exist within the Erie portion of the Lake Erie Basin.

4. Assured that if mercury is found in any of the waste discharges in excess of 0.005 mg/l, enforcement action will be initiated immediately to require immediate and complete abatement.

5. No mercury has been found in the tissue of fish collected from Lake Erie in excess of 0.5 mg/l limit set by the Federal Pure Food & Drug Administration and the World Health Organization.

May 13, 1970

Ontario and Michigan officials met in Toronto to reconsider the fishing ban and arrive at an agreement for possible reopening of fishing in Lake St. Clair, Detroit, and St. Clair Rivers. It was agreed that a catch and release restriction be imposed by both governments which will make possession of fish illegal.

Effluent samples from the National Aeronautics & Space Administration, Lewis Research Center, were obtained for mercury analysis by FWQA, Lake Erie Basin Office.

817-a

May 14, 1970

Ontario Officials announced the reopening of sports fishing in Canadian waters of Lake St. Clair and the St. Clair and Detroit Rivers. No catch and release restrictions were imposed; however, warnings on the eating of fish were made.

May 15, 1970

Governor Milliken of Michigan announced that a statement will be issued next week on Michigan's decision to relax the sports fishing ban on U. S. waters of Lake St. Clair and the St. Clair River.

Officials of the New York State Conservation Department closed all fishing in Onondago Lake at Syracuse because of mercury contamination. The State Conservation Department also recommended that fish caught in Lake Ontario and the Oswego River not be eaten.

The Wisconsin Department of Natural Resources held a public hearing concerning Wyandotte Chemical Corporation of Port Edward's discharge of mercury wastes to the Wisconsin River.

Regional Director, New York State Health Department, Syracuse, sent a telegram to Allied Chemical Corporation, Solvay, New York asking the Corporation to present the Department of Health a definitive time schedule for complete elimination of mercury from their liquid waste discharge. Allied Chemical was asked to respond by May 25, 1970. Similar instructions were transmitted to Olin Mathieson Corporation of Niagra Falls, New York. The Olin Mathieson Corporation was asked to meet with State Officials to discuss a suitable time schedule.

817-b

Representative from the Ohio Department of Health and FWQA, Lake Erie Basin Office visited the General Electric Company, Cleveland Lamp Plant, to obtain information pertaining to mercury usage.

A representative from FWQA, Lake Erie Basin Office visited the General Electric Company, Bucyrus Lamp Plant,to obtain information pertaining to mercury usage.

Effluent samples from General Electric Technical Products Plant were obtained for mercury analyses by Lake Erie Basin Office. The Regional Director, Great Lakes Region, advised the Deputy Commissioner, New York Department of Health, of findings pertaining to Allied Chemical, Buffalo Dye Division, and requested to be kept abreast of any enforcement action that may be pending. The New York Department of Health requested Allied Chemical Company to submit a schedule to eliminate mercury discharges.

May 18, 1970

Representatives from the FWQA, Lake Erie Basin Office, Ohio Dept. of Health, and the NFIC, Cincinnati, met in Columbus, Ohio to exchange mercury data.

May 19, 1970

Representatives from FWQA, Lake Michigan Basin Office and Illinois State Sanitary Water Board visited the Monsanto Company of Sauget, Illinois to inspect plant operations and sample plant effluent and sludge from the brine reaction tank.

MR. STEIN: All right. Any comments or questions?

(No response.)

I didn't want to belabor the point, but when they talked about detectable limits, they talked about all below 5 ppb. And you were 500 percent lower than that for your detectable limit on 1 ppb. That is a big spread.

All right, thank you.

Any comments?

(No response.)

Mr. Purdy, did you have someone else?

MR. PURDY: Dr. Shannon from the Detroit Water Bureau would like to be heard.

STATEMENT OF ALBERT M. SHANNON
CHIEF, WATER AND WASTEWATER TREATMENT
DETROIT METRO WATER DEPARTMENT

DR. SHANNON: Mr. Chairman, conferees, ladies and gentlemen, my name is Albert M. Shannon, and I am chief of Water and Wastewater Treatment for the Detroit Metro Water Department. I would like to make a brief statement on the results of our monitoring program for mercury, both at our two raw water intakes and on the incoming raw sewage and the plant effluent at our sewage treatment plant.

One of our intakes, the Waterworks Spartan plant, is indicated on the upper end of Belle Island, the upper Detroit River. The southwest intake is located off the northern tip of Fighting Island in Canadian waters. And that is in the lower Detroit River.

To date we have determined the mercury in 36 daily 24-hour composite samples, also 12 weekly composite samples, making a total of 48 samples. And to date, we found no measurable quantities of mercury. And the limit of our accuracy sensitivity is 2 parts per billion.

Now, since May 11, we have run daily 24-hour composite samples of raw sewage and also the plant effluent. And that is 25 samples of raw sewage and 25 samples of plant effluent. And none of these samples showed the presence of detectable quantities of mercury. And, again, here the limit is 2 parts per billion.

That's all. Thank you.

MR. STEIN: Two parts what?

DR. SHANNON: Two parts per billion.

MR. STEIN: O.K. Thanks.

Did you ever find mercury in your drinking water here?

DR. SHANNON: No, none at all.

MR. STEIN: But again, you see what we have had here. We are up with the third figure -- 5, 2 and 1. And

I think my suggestion is that we try to get together on this if we haven't gotten together yet. And I ask Mr. Van Den Berg to do this because we are getting out the report.

We should make a proposal for what we think is the detectable limit that we are going to go down to, and if you don't find you have a consensus on that, you better get together with the other people who are doing these tests and come up with something that you can agree on. Because unless you have this, we are never going to get the program off the ground.

I say this, not only for mercury, but we are going to have to do this for every toxic substance if we are going to deal with it.

MR. LYON: I think if we are going to do this, Mr. Chairman, we should not, I suspect, be only concerned with the detectable limit, but also the range of accuracy of the test of the detectable limit.

MR. STEIN: I think that is one of the big factors. I think the ability of everyone to do the test and the accuracy of the test are two of the factors which go into what we universally say is the detectable limit.

MR. LYON: Because we found with our fish, there was a 3-to-1 relationship between two laboratories of the FDA -- one in Cincinnati, one in Chicago. So it isn't merely a question of detectable limit, but also a question of the accuracy of the test.

MR. STEIN: These are the issues.

By the way, don't think this is anything special because we have had this over and over again in every other substance--every other thing we have dealt with in this field. Not only have we had it, Food and Drug has it, and everyone else has got the same problem. But, gentlemen, this just has to be worked out if we are going to move.

Are there any other questions or problems?

(No response.)

If not, thank you very much, sir.

MR. PURDY: Mr. Stein, I have passed out a statement to all the conferees and to the stenographer, that I would like to have placed in the record as if read. It covers the mercury contamination problem here in Michigan and the action that we have taken on it. There are certain parts, in view of Mr. Atwood's statement yesterday, that I would have liked to have gone over in detail. But because of the lateness of the hour, I think I will pass it up. But I do not agree that State and Federal officials knew about it and didn't take action on it.

This was a matter of where the mercury problem was not recognized. As soon as it was recognized, action was taken on it. Mr. Atwood didn't say it as a part of this report, but I noted it in the paper. It stated the State agencies failed to take action until the newspapers forced them to do so.

Again, I do not agree this is the case. And my statement will show that it was not.

MR. STEIN: Without objection, that will be entered into the record as if read.

(The above-mentioned statement follows in its entirety.)

STATEMENT OF R. W. PURDY, EXECUTIVE SECRETARY
MICHIGAN WATER RESOURCES COMMISSION

Regarding Mercury Contamination Problem

June 3, 1970

I am pleased to have this opportunity to discuss the problems of environmental contamination by mercury compounds. We are very concerned over this matter and the State of Michigan has placed high priority on fully investigating and dealing with the problems of mercury contamination.

The recent mercury contamination problem in the Lake St. Clair - Detroit River area came as a near total surprise, without warning or anticipation. It seems that nobody recognized the problem of mercury contamination in the United States prior to the emergence of certain problems within the last year. In view of the limited, although catastrophic world experience with the problem, the lack of knowledge and apprehension over mercury throughout the United States at both State and Federal levels is a complete paradox.

In spite of the history of mercury contamination, the problem was largely unrecognized in this country. The pollution problems of the St. Clair River, Lake St. Clair, the Detroit River and Lake Erie have been thoroughly studied and extensively documented. In April of 1965, the U.S. Public Health Service of the Department of Health, Education and Welfare, now the Federal Water Quality Administration, with the cooperation of the Michigan Water Resources Commission, completed an exhaustive report on the pollution of the Detroit River, Michigan waters of Lake Erie, and their tributaries. There was no mention of mercury problems in that report.

The State of Michigan is also actively participating in the Lake Erie Federal-State Enforcement Conference and in the pollution studies of the International Joint Commission. The possibility of widespread mercury contamination has never been considered in these studies until the last two months.

We have on many occasions collected and analyzed samples of the wastewater effluent from the Wyandotte Chemical Plant which was until recently discharging mercury compounds in its wastewater. This testing was undertaken in the development of an appropriate water pollution control program for this plant. The mercury levels of this discharge were never considered since the need was unknown.

In April, 1968, the report of the National Technical Advisory Committee on Water Quality was published by the Federal Water Pollution Control Administration. This document was considered the most comprehensive document on water quality requirements at that time. It was the work of 5 subcommittees involving some 90 experts in the field of water pollution. There was only a very brief mention of mercury and there was no indication of its possible significance.

In this discussion, my point is not to justify our own lack of knowledge about mercury contamination of the environment but rather to emphasize a gap, a rather serious gap, in our present environmental protection programs. The current mercury crisis developed almost overnight without warning; however, the contamination has apparently existed for some time. I strongly believe that we must take appropriate steps to ensure that any similar problem is recognized and countered in the early stages before serious damage results.

We first became aware of the possibility of mercury contamination in the Great Lakes at a meeting on February 11, 1970 in Toronto, Canada of the International Joint Commission's Advisory Board on Control of Pollution of Boundary Waters. At that meeting, Canadian officials indicated their concern over the possibility of mercury contamination and reported that studies were underway.

The following day, we began to investigate possible sources of mercury. Of the three chlor-alkali plants in Michigan, we found one which used mercury in its process. This was the Wyandotte Chemical Company plant on the Detroit River. Subsequent investigations revealed that this plant was discharging with its wastewater 10 to 20 pounds of mercury per day. At the time of initial contact with the Wyandotte Chemical Company, the full impact of the mercury problem was not yet known. Company officials were caution about the possible pollution problem and were asked to ascertain the exact amount of mercury being consumed and lost. The Company was also advised to begin an immediate study of ways to abate the discharge of mercury.

Later in March, laboratory analyses of fish from Lake St. Clair area waters conducted by a California laboratory were received by Canadian officials and because of high levels of mercury residues, 12,000 pounds of fish caught in Lake St. Clair were seized by Canadian officials. Two weeks afterwards, Ontario banned all fishing on the St. Clair River, Lake St. Clair, and the Detroit River.

A series of steps were instituted to evaluate the level of mercury in the environment and to pin-point possible sources in the Lake St. Clair-Detroit River area and in the rest of the state as well.

Fish samples were collected by the Department of Natural Resources from Lake St. Clair for analysis by the Detroit Office of the Food and Drug Administration. Later, fish from throughout the state were collected for testing by the Food and Drug Administration and the Michigan Department of Agriculture. We endeavored to enlist the cooperation of all laboratories in the area as quickly as possible. We found that only the Food and Drug Administration could readily undertake mercury analysis. Arrangements were subsequently worked out for the analysis of various samples with the Federal Water Quality Administration's Grosse Ile (Michigan) laboratory, the Wisconsin Alumni Research Foundation's laboratory which was under contract with the Bureau of Commercial Fisheries, the Phoenix and School of Public Health laboratories of the University of Michigan, and the Dow Chemical Company at Midland which offered its assistance.

Arrangements were also made to cooperate with the Ontario Water Resources Commission and with the Ohio Department of Agriculture.

In succeeding days, the following additional steps were taken to further define the magnitude and scope of possible mercury contamination throughout the state:

a. The Michigan Department of Public Health undertook to immediately test all public water systems using the St. Clair River, Lake St. Clair, or the Detroit River as a water supply source. A sampling program of domestic water supplies in this area continues on a weekly basis and will remain in effect as long as considered necessary.

b. To identify other uses of mercury or mercury compounds, all 35 pulp and paper mills in Michigan were contacted by telephone. In addition, letters were sent to some 700 industries, commercial establishments and individuals requesting information on the use of mercury and also on the use of arsenic, cadmium, lead or any other heavy metal. Response to this request has been good and information continues to be received.

c. Arrangements were made for the analysis of wastewater samples from some three dozen municipal sewage treatment plants throughout the state which treat industrial waste and might therefore contain mercury in their discharges.

d. Bottom sediment samples were collected at the mouths of major rivers entering the Great Lakes and also below municipal and industrial waste treatment plant outlets. Fish samples were collected at these same locations.

e. The Department of Public Health undertook to examine persons in the Lake St. Clair area who were heavy fish consumers to ascertain if there were any adverse effects from the mercury contamination.

Only two significant discharges of mercury compounds were located in the State of Michigan. The Wyandotte Chemical Plant on the Detroit River and a General Electric Company plant located at Edmore, Michigan which discharged its waste to a tributary of the Pine River. Wyandotte Chemical proceeded to install a temporary treatment facility which cut its mercury discharge by 80 to 90 percent to less than 2 pounds per day. This reduced discharge was subsequently found unacceptable and a temporary injunction was obtained by the Michigan Attorney General prohibiting any further mercury discharges. Wyandotte Chemical then shut down its mercury cell chlor-alkali operations.

Wyandotte Chemical has since formulated a plan which has been accepted by the Water Resources Commission and entered in a circuit court consent order whereby all process wastewater containing mercury will be recycled to a cavity located 1200 feet underground from which the company obtains its salt supply. The Company will treat the wastewater to remove the maximum amount of mercury before recycling and is further required to have permanent above ground control facilities in operation in one year. The above ground recycling system is expected to cost about $1.5 million and when installed will be the most sophisticated mercury control facility known to exist in the world.

The Edmore plant of the General Electric Company was notified that all discharges containing mercury must be ceased immediately or the Attorney General would be requested to take appropriate legal action. The Company proceeded to promptly halt all mercury discharges.

On April 11, Governor Milliken together with appropriate state officials conferred in Toronto, Canada with representatives of the Canadian Federal Government, the Province of Ontario, U.S. Federal agencies, and the State of Ohio. A key objective of the meeting was to review the information collected by the canadians and obtain their assessment of the situation. A seven point joint program was agreed upon, including the closing by Michigan of Lake St. Clair and the St. Clair River to all fishing.

Later, Michigan indefinitely postponed the opening of the commercial fishing walleye season in Lake Erie and initiated a program to screen all commercial fish catches in Lake Erie for actionable levels of mercury.

As the situation presently stands, the Lake Erie commercial walleye season remains closed. We have been informed that virtually all commercial fishing in the Michigan waters of Lake Erie has stopped. Sportfishing is permitted in Lake Erie however the possession of walleye, white bass or sheepshead is prohibited. The same regulations have also been applied to sportfishing in Southern Lake Huron principally because of the migratory habits of walleye.

In Lake St. Clair, the St. Clair River and the Detroit River, sportfishing is permitted on a catch and release basis only. Possession of any fish from these waters is illegal. The Ontario ban on all fishing in the St. Clair River, Lake St. Clair and the Detroit River has been discontinued.

We do not know if the mercury content of fish in Lake St. Clair is increasing or decreasing. In order to attempt to make such a determination, a special sampling program will be initiated to monitor particular species of fish from Lake St. Clair. It is planned to collect a statistically significant sample in July and again in the fall for purposes of comparison.

In investigating possible sources of mercury, we learned that mercury and mercury compounds are used in numerous and diverse everyday operations such as:

--in diaper laundries;
--in marine and acrylic based paints;
--in the manufacture of acetylene, polyvinylchlorides, chlorine and caustic soda;
--in seed, lawn and pulpwood fungicides;
--in hospitals;
--in mercury seals in trickling filter sewage treatment plants;
--in mercury batteries;
--and in paper making plants.

Possible sources of mercury, although generally small ones, are present throughout our society. It is clear, therefore, that mercury sampling must become an integral part of regular water quality and environmental monitoring.

As a result of the extensive amount of mercury sampling that has been completed, we now have a good estimate of the magnitude of mercury in the water environment. No measurable mercury was found in any water supply system obtaining its water from the St. Clair River, Lake St. Clair, Detroit River, or Lake Erie. Sampling analysis of (a) certain industrial wastewaters, (b) sewage in communities where industries discharge wastes to municipal sewer systems, and (c) river bottom sediments at the mouths of major rivers entering the Great Lakes and at locations below municipal and industrial discharges indicated no mercury or only trace amounts. This confirms our earlier belief that only Wyandotte Chemical Corporation at Wyandotte and General Electric Company at Edmore were the only sizeable dischargers of mercury or mercury compounds in the state.

The Federal Water Quality Administration has completed extensive tests of bottom sediment samples from Lake St. Clair, the Detroit River, and Lake Erie. Their results show no significant amounts of mercury in the sediments of the Michigan portion of Lake St. Clair. Mercury has been found in the sediments of the Detroit River below the Wyandotte Chemical outfall and has been found in Lake Erie sediments in very low levels over a wide area.

In regard to these contaminated sediments, we do not know the effective life of the mercury constituents. One source has suggested the effects of the pollution may last for 10 to 100 years unless the mercury is made inactive either by its physical removal or by elimination of its biological availability.

We are evaluating the feasibility of removing contaminated sediments through dredging. It has been estimated that to dredge a strip 150 feet wide, 3 feet deep and 1 mile long of the Detroit River would cost approximately one-half million dollars. The cost of dredging Lake Erie, due to the large area involved, would be enormously expensive. Dredging, moreover, could conceivably cause significant environmental damage includ-the possible additional releases of mercury compounds to the aquatic environment. No conclusion has been reached as yet on the possibility of any dredging. Efforts are also underway to determine whether there is any possible way to chemically neutralize or bind the mercury in bottom sediments within the affected area. Results to date do not indicate any practical method of chemical treatment of the contaminated bottom sediments.

As I have stated previously, the contamination of the environment by mercury compounds represents a serious fault in our present environmental protection programs. Looking back at the serious incidents which occurred in Japan and Sweden, our lack of knowledge about the use, disposal, effects and other characteristics of mercury compounds now appears incredible. It is clear however, that we must institute adequate methods of safeguarding the environment from any future catastrophies. I see four areas which are in need of urgent action:

1. A broadened environmental sampling and monitoring program to identify all possible environmental contaminants;

2. Better information on the use and disposal of the thousands of products, raw materials, catalysts, by-products and waste products involved in industrial production;

3. Increased efforts to investigate the environmental effects of the many industrial chemicals and other substances presently in use and a systematic program to evaluate all new products before they are marketed;

4. A national clearing house to coordinate all of the above activities and to help alert pollution control officials regarding emerging and potential problem situations.

On our part, Michigan has taken new initiatives to increase our efforts to safeguard the environment. Governor Milliken has introduced legislation to:

1. Require the registration of all manufactured products, processes, production materials, by-products and waste products by all industries and businesses within the state which discharge industrial wastewater.

2. Impose a surveillance fee on all commercial and industrial enterprises which use the waters of the state for waste disposal purposes. The revenue raised by this surveillance fee will be used to augment the state's pollution detection, surveillance, and control capability.

The additional funds and information that will be made available through these measures will enable us to provide increased protection for the environment and for our citizens. We strongly urge that new national efforts also be undertaken and we offer our cooperation and assistance in any way possible.

Thank you.

829-

MR. STEIN: Are there any other comments or questions?

(No response.)

If not, I would like to thank you all for coming. I think we had a very, very productive session. As with all the sessions, they do take some time. I think we made a lot of progress in evaluating where we are in the cleanup on Lake Erie and the municipal and industrial sources. I think it is fair to say that while the purpose of these conferences is to emphasize the slippage, the laggards and the places that didn't come through, if you look at the program as a whole, you will find that we are making very substantial progress in moving towards the cleanup of Lake Erie. Municipalities and industries are putting in these remedial facilities.

We will be getting local information in the various workshops we conduct the week after next. I would suggest when all that material is in, we will call the conferees back, I hope for a very brief session, where we can come up with conclusions and recommendations.

We have all made certain commitments here that I hope will be forthcoming. One, and I think an important one and one that should not be overlooked, is the precedent we have established for the State and the Federal Water

830<

Quality Administration to get together on the recommendation on dredging before any deposits containing mercury are even disturbed. I think that may serve to be a pattern for the country where we have this.

The second thing, if these dredgings are to be disturbed, we are going to come up with a joint recommendation on where they are to be placed.

I think we have a program here of either stopping significant discharges of mercury into Lake Erie or taking appropriate action. I think all the significant sources we know of have been named here. We are going over those and we should be on our way in a week. Either they are going to be stopped, or action is going to be taken by the State or Federal authorities to stop them. I think we have taken quite a leg up on attempting to deal with the problems inherent in controlling a toxic material such as mercury. As far as I know, this is the first little baby step towards a tremendous program in this whole area.

I don't think it could have been done with a better group of people than the people we have here in the Lake Erie States. I hope we are going to be able to develop something that is going to show the way for the Nation to get at the mercury problem and the whole question of disposal of toxic substances.

For those of you who have stayed with us, you may just barely be able to see the complexity of the problem we have to deal with. But we are going to move forward and meet it, I am sure.

Are there any other comments or questions?

MR. PURDY: Mr. Stein, on your suggestion of a meeting following the workshops and following this conference here, I have in mind what took place at the so-called executive session of the Lake Michigan Enforcement Conference. I think we need to have citizen participation. And it seems to me that the meeting today and the workshop gives the opportunity for citizen participation. And unless we are just going to talk something to death, we need that opportunity of gathering in an executive session so that the conferees can reach recommendations and conclusions and put something on the road here.

And I have no objection to the open executive sessions if we can draw up an agenda, limit the discussion to the conferees, and move forward on recommendations and conclusions. If it is impossible to do this in an open executive session, I would request that we make it at least a semi-closed executive session so that we do more than just talk.

MR. STEIN: Right. I agree with that suggestion.

Let me tell you, we have opened up these proceedings, as you know, in the past. We have no secrets. And we have always tried to have our proceedings public, including our executive sessions. But if people are going to think that part of the social revolution requires them to come in and be heard at every meeting or disrupt the meeting if they are not going to be heard, then we are just going to have to resort to going into a room where we are just going to allow the conferees and their immediate staff and exclude the public.

Again, I talked about being stupid and abusing the privilege. If that is what people want to do, they are welcome to do it.

I think in the Chicago situation, we were faced with the extraordinary situation where people came in and demanded to be heard. And at least my judgment was that they felt it was their public duty and they were making a contribution to the good of mankind if they could get their heads opened, particularly if there was a TV camera around. We had about 18 TV cameras.

In addition to that, we had some officials who I think felt it was their public duty to have an opportunity to open some heads. So all the ducks were on the pond. And I think you have a very difficult situation in those cases.

Now, I deplore this, and I think if we are going to be faced with this, Mr. Purdy, there is going to be no alternative but to get a small room, go in and lock the door and go on with our business. I would like you to come in and see what we do. But unless the public is mature enough to recognize that it has been given a full opportunity to talk, we are going to have a different type of executive session from now on. The people's privilege is there to see us go through this, but when the time comes for an executive session, we have to make a decision.

MR. PURDY: I am not criticizing your handling of that meeting. I just think there is not that much time available.

MR. STEIN: That's right. That is right. I couldn't agree with you more.

Are we all set?

MR. POOLE: I commended him privately for his handling of the Chicago meeting. So I can't criticize him. He had no alternative.

MR. STEIN: Are there any other questions or comments?

(No response.)

If not, thank you very much. And we stand adjourned.

(Whereupon, at 4:32 o'clock p.m., the hearing adjourned.)

834<

CITY OF EUCLID
ENGINEERING DEPARTMENT
585 EAST 222nd STREET
EUCLID, OHIO 44123
(216) 731-6000

HARRY J. KNUTH
[illegible]
Mayor

TONY J. SUSTARSIC
Administrative Director

STANLEY L. CESEN
City Engineer

June 29, 1970

Department of Interior
Federal Water Quality Administration
Washington, D. C. 20242

Attention: Mr. Murray Stein
Chief of Enforcement

Dear Sir:

At the April 15th meeting of the Ohio Water Pollution Board, the City of Euclid made a presentation outlining the status of its pollution abatement program. A copy of this statement is enclosed.

We feel that you should have a copy of this statement so that you will know that Euclid is progressing to the utmost of its ability in the pollution abatement program.

Very truly yours,

Stanley L. Cesen

Stanley L. Cesen
City Engineer

SLC:mb
Encl.

cc: Mr. George Harlow, Director
Lake Erie Basin Office
Mayor Harry J. Knuth
Administrative Director T. J. Sustarsic

STATEMENT TO THE WATER POLLUTION CONTROL BOARD MEETING, APRIL 15, 1970

Mr. Chairman, Members of the Board, interested citizens:

The City of Euclid regrets that it was unable to comply with the original timetable for proposed improvements and additions to its wastewater treatment plant. Problems associated with the site of the existing treatment plant delayed the submission of the engineering report and subsequent council action. The Board was apprised as to the nature of these delays when the new target dates were set.

At the present time, Euclid is operating under a Water Pollution Control Board Permit which expires October 15, 1970 and complying with the conditions thereof as follows:

1. A pilot plant study is under way to determine the processes which can best be used at the present treatment plant site for secondary treatment and phosphate removal.

2. Upon receipt of the engineer's report of the findings of the pilot plant study and recommendations derived therefrom, and with the concurrence of the State Department of Health, the City will authorize the preparation of detail plans and specifications for the improvements to the treatment facilities.

3. Detail plans and specifications for sludge disposal facilities are in the process of preparation.

4. Our present treatment plant facilities are being operated satisfactorily by licensed operators, a fact which was confirmed by a recent inspection by the Health Department. Monthly and annual operating reports are being submitted to the Health Department.

5. The program for reducing the amount of storm water in the sanitary sewers is being carried out vigorously. In several areas, new sewers and connections have been built, are under construction or are being designed which will result in the elimination of storm water from the sanitary sewer system.

6. The City is continuing its monitoring of industries discharging wastewater to the Euclid sanitary sewers and drains. A City permit system is used. Industries which perform pretreatment submit monthly operating reports to the City. These reports are reviewed by the City's wastewater chemist. Frequent visits are made to plants and samples from the sewer system are collected and tested periodically.

The City of Euclid expects to have construction of its wastewater treatment plant improvements completed by December 1, 1972.

Respectfully submitted
The City of Euclid